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Pulverized Coal for Malleable Furnaces

Capacity Increased About 20 Per Cent by a
Recent Installation—Equipment and
Some of the Advantages

AFTER a preliminary trial of pulverized coal for melting, the American Radiator Co., Buffalo, has now in successful daily operation a complete pulverized coal equipment, possessing some novel features of design and operation. At the malleable plant of the company, located at Elmwood Avenue, six melting furnaces and 12 annealing ovens are operated to produce the malleable castings required for their own use and to supply their custom trade.

The furnaces are 40-ton capacity, having been in-

sisting of a receiving and preparation plant, conveying system and firing system having an improved method of coal and air control, was installed. A description of the pulverized coal plant with illustrations follows:

Drying and Pulverizing

In the coal preparation plant the coal is discharged into a track hopper and conveyed into the building by an apron conveyor. The coal passes through a crusher and is reduced to lumps of from 1-in. to 1¼-in. mesh,

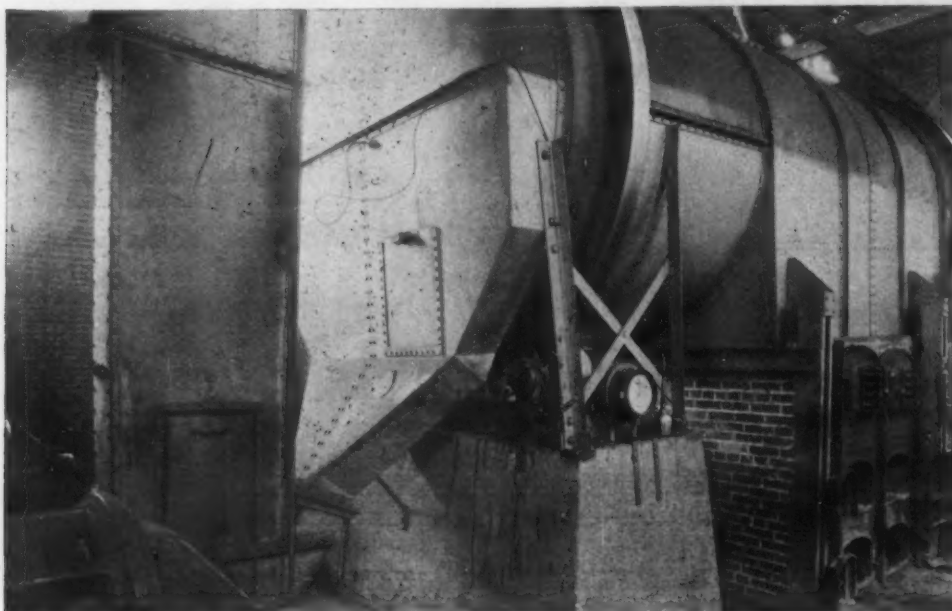


One of the Malleable Furnaces Equipped with the Powdered Coal Firing Unit

creased in capacity about 20 per cent by changing from hand firing to pulverized coal. This was done by eliminating the grate of the hand-fired furnace and increasing the effective length of the bath. About 25 per cent of total production is required to meet the company demands, the remaining 75 per cent being custom trade made up of automobile work, railroad and general supplies. The size of the castings cover quite a range running from 2 oz. to 100 lb., calling for iron which is hot and fluid in order to prevent miss-runs. After a careful investigation of powdered coal systems, a complete plant, offered by the Grindle Fuel Equipment Co., con-

then conveyed by a bucket elevator and discharged to a belt passing over a magnetic pulley to remove the iron content. The magnetic pulley belt discharges into an automatic scale which weighs and dumps the coal into a 40-ton hopper located over the dryer.

From the 40-ton hopper the crushed coal is fed by means of a motor driven screw feeder having a varying mechanical speed control to the Grindle dryer where the moisture is removed to 1 per cent or less. The dryer is compact and economical of floor space, this being a special feature. The dryer is fired by hand, although most of the Grindle installations are pulver-



The Grindle Dryer
Where the Moisture
Is Removed From
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ized-coal fired. A recording pyrometer shows the temperature of the coal leaving the dryer and is watched carefully by the fireman so as to maintain a uniform discharge temperature. From the dryer the coal is elevated to two 3-ton bins, feeding two 5-ton Raymond mills, motor driven, shown in an illustration. From the pulverizing mills the coal of the desired fineness is raised by the exhausters to the cyclone collectors where the coal and air are separated, the coal passing down to a 30-ton powdered coal storage hopper, which supplies the coal feeders.

Feeding Equipment to Furnaces

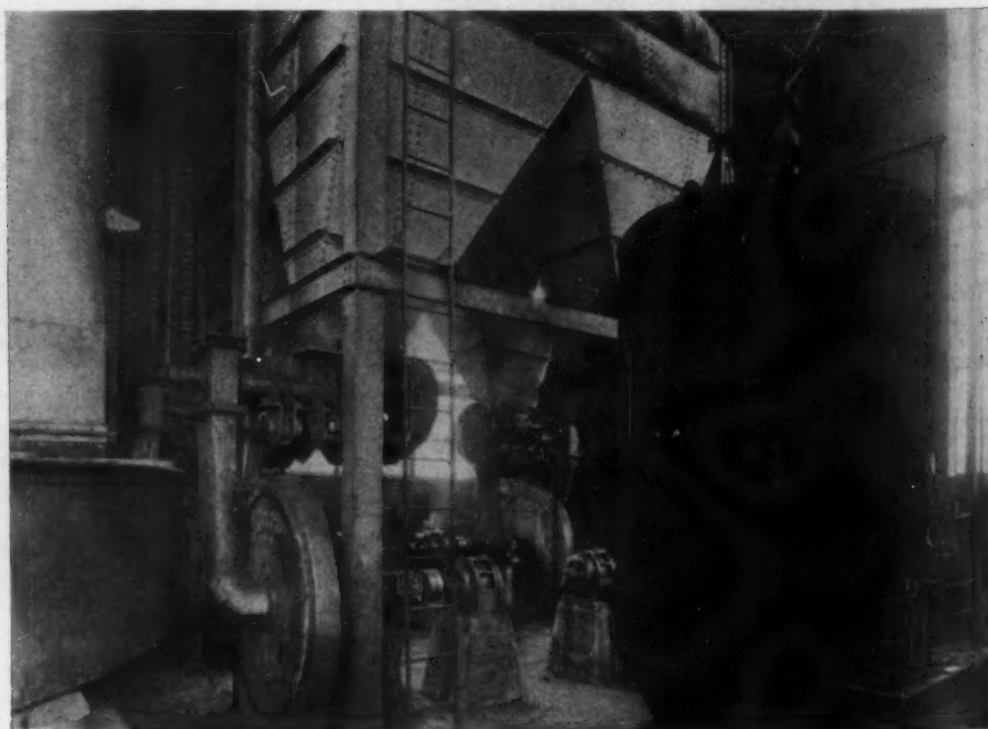
The melting furnaces are located from 400 to 600 ft. away from the coal preparation plant and the coal is conveyed from the feeders located in the preparation plant through spiral lock-seam pipes running overhead to the firing equipment at the furnace. One illustration

shows one feeder consisting of one motor driven screw of special design for delivering coal at a uniform rate of feed, which is essential if maximum results are to be obtained from the melting furnace. The speed of the screw is variable and is controlled by the furnace operator at the furnace several hundred feet away.

This electrically operated remote control is quite satisfactory in operation, a dial on the control board at the furnace showing the furnace man the amount of coal feed at all times. The coal feed can be raised or lowered at will by push button control, the amount of coal feed varying from about 15 lb. to 40 lb. per min. on each furnace. One melting furnace complete with firing unit is shown in another illustration. The simplicity of this arrangement is noticeable, there being no bin to interfere with crane operations and no pit or any equipment below ground level.

The firing equipment consists of an exhaustor which

The Weighing Tank and Scale. Are Shown in This Illustration as Well as the Four Coal Feeders Which Deliver Coal to the Exhausters Which in Turn Deliver the Coal to Individual Lines Running to the Melting Furnaces





From the Dryer the
Coal Is Elevated to
Two 3-Ton Bins
Having Two 5-Ton
Raymond Mills
Motor Driven

receives the coal from the preparation plant and which is blown over with just sufficient air to keep the coal line clean. The secondary air or air required to promote combustion is taken through the graduated disk gate and conveyed through the carburetors and enters the furnace thoroughly mixed and in the proper proportions for ignition and generating the high temperature required for malleable melting.

Coal is conveyed to the annealing ovens by a Grindle pneumatic conveying system consisting of a 5-ton weighing tank located in the preparation plant together with a pneumatic feeder delivering to a 4-in. line running to two storage hoppers at the ovens. The coal is accurately weighed before blowing to the ovens and an accurate check kept on coal consumption. A view of the weighing tank and scale is shown which also reveals four coal feeders which deliver coal to the exhausters, which in turn deliver the coal to individual lines running to the melting furnaces. This plant is well equipped with labor saving devices for handling the product from raw material to the finished product.

At the melting furnaces three 5-ton Whiting bridge cranes are used to bring in the charge, handle the bungs, charge the furnaces, carry the molten iron in ladles, slag removal and other furnace operations, these cranes running the full length of the shop and serving all the furnaces. One 5-ton crane is used to serve the annealing ovens, handling the pots, castings, sand, etc., and running the full length of the ovens.

The foundry is laid out for future extension. All castings are sand blasted after tumbling, an elaborate sand blasting equipment is installed and in successful operation, both table and tumbler type.

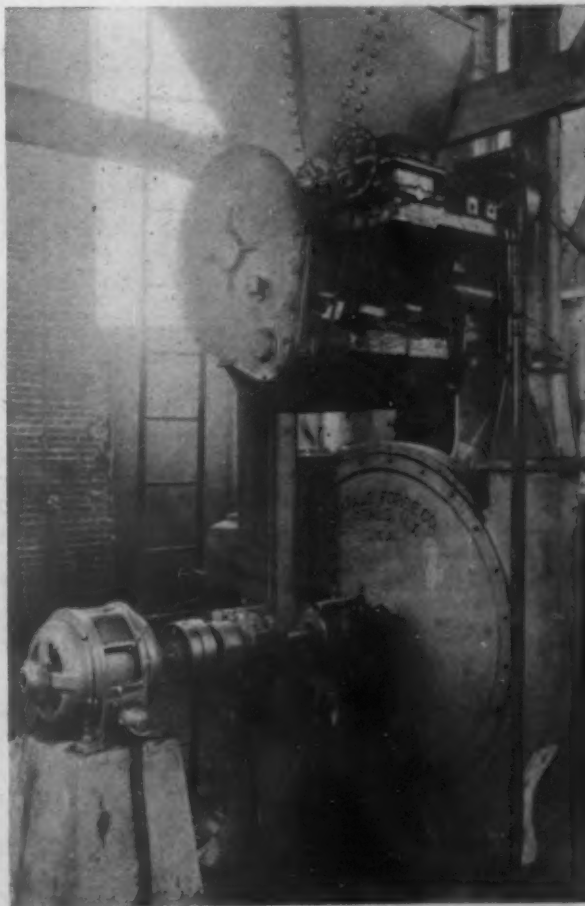
The shipment of sea coal, which is pulverized coal of a fineness suitable to the quality of the castings produced, is also an important feature of the pulverized coal equipment. One carload of sea coal is shipped per day, some of this going to other plants of the American Radiator Co. and considerable quantities are sold to other users of this product.

To meet the foundry requirements, pattern shops for wood and metal patterns are equipped with up to date appliances for accurate and rapid production. Five Clark truck tractors are used in the plant for general handling of materials, more particularly the transportation of sand and refuse. Since the application of pulverized coal to all melting and annealing operations an increased production of about 20 per cent has been obtained. In addition to this the burning of pulverized coal has resulted in other advantages as follows:

- Cleanliness, with an absence of smoke in the foundry and surrounding atmosphere.
- Saving in coal consumption.
- Saving in time and labor.
- Less scrap when poured off.
- Iron is hot and can be tapped on time.

More uniform product is obtained both in chemical and physical requirements.
Increased capacity of furnaces.
Better working conditions.

No skimming of the charge is necessary. This is different from the general practice in malleable work, but the practice as carried out by the American Radiator Co. is satisfactory.



A Feeder Consists of a Motor Driven Screw of Special Design for Delivering Coal at a Uniform Rate of Feed. The speed of the screw is variable and is controlled by the furnace operator at the furnace several hundred feet away

AMERICAN MACHINERY TRADE

Exports and Imports in April of Machine Tools and Other Machinery

WASHINGTON, May 26.—United States exports of machinery in April were valued at \$28,547,954, against \$26,744,109 in March. Included were exports of ma-

Machinery Exports from the United States (By Value)

	April, 1923	April, 1924	Ten Months Ended April, 1923	April, 1924
Locomotives.....	\$140,728	\$181,484	\$4,796,201	\$3,363,596
Other Steam Engines.....	88,016	109,974	1,574,398	955,884
Boilers.....	132,201	152,960	1,072,755	1,579,519
Accessories and Parts.....	282,540	137,204	2,883,977	1,481,121
Automobile Engines.....	571,147	268,273	3,846,346	3,599,403
Other Internal Combustion Engines.....	565,069	790,862	4,045,833	5,651,711
Accessories and Parts for.....	286,616	355,184	2,404,601	3,082,808
Electric Locomotives.....	320,112	274,247	2,610,224	1,671,961
Other Electric Machinery and Apparatus.....	706,393	763,628	5,691,554	7,703,653
Excavating Machinery.....	101,981	121,188	1,210,718	1,429,910
Concrete Mixers.....	66,951	68,243	457,154	490,916
Road Making Machinery.....	68,836	136,686	342,991	875,113
Elevators and Elevator Ma- chinery.....	210,399	311,735	2,040,128	3,686,166
Mining and Quarrying Ma- chinery.....	743,190	945,779	6,436,702	9,264,039
Oil Well Machinery.....	534,467	701,906	3,989,359	5,912,077
Pumps.....	596,568	578,727	5,494,395	6,428,239
Lathes.....	66,001	86,850	585,144	1,076,708
Boring and Drilling Machines.....	107,432	28,866	505,561	553,452
Planers, Shapers and Slotters.....	20,554	14,438	201,882	220,857
Bending and Power Presses.....	4,142	22,471	133,141	362,006
Gear Cutters.....	9,724	43,695	116,025	317,861
Milling Machines.....	26,320	30,524	371,571	360,936
Thread Cutting and Screw Machines.....	27,362	32,570	257,757	545,301
Punching and Shearing Ma- chines.....	10,235	9,753	109,379	119,055
Power Hammers.....	8,168	10,963	121,996	148,093
Rolling Machines.....	1,096	275	145,103	102,367
Sharpening and Grinding Ma- chines.....	69,678	111,790	752,270	442,968
Other Metal Working Ma- chinery and Parts of.....	343,170	382,698	4,651,482	3,741,770
Textile Machinery.....	793,410	835,728	8,241,726	7,045,276
Sewing Machines.....	541,240	687,870	6,897,338	8,517,993
Shoe Machinery.....	93,881	133,896	988,770	1,041,595
Flour-Mill and Gristmill Ma- chinery.....	88,227	57,163	920,330	963,870
Sugar-mill Machinery.....	146,920	132,310	3,318,454	6,001,528
Paper and Pulp Mill Machinery.....	252,898	147,099	1,749,361	1,627,508
Sawmill Machinery.....	40,500	53,639	497,321	523,953
Other Woodworking Machinery.....	123,712	120,574	1,258,595	1,079,084
Refrigerating and Ice Making Machinery.....	220,626	189,026	1,676,150	941,035
Air Compressors.....	205,039	268,516	2,089,565	2,460,476
Typewriters.....	1,504,916	1,431,650	10,532,336	12,901,416
Power Laundry Machinery.....	103,625	96,365	779,061	795,586
Typesetting Machines.....	271,549	319,907	3,057,586	3,384,286
Printing Presses.....	290,692	315,382	3,518,502	4,090,913
Agricultural Machinery and Implements.....	3,982,878	6,741,647	28,515,003	49,212,588
All Other Machinery and Parts.....	8,185,765	10,354,198	78,447,320	96,136,524
Total.....	\$23,254,974	\$28,547,954	\$209,306,067	\$260,991,121

chine tools in April amounting to 5728 in number and \$520,439 in value, against 4029 valued at \$544,409 in March.

For the ten months of the fiscal year the machinery imports of \$260,991,121 exceeded last year's (ten months) of \$209,306,067 by 24½ per cent. The largest item, agricultural machinery, was \$49,212,588, compared with \$28,515,003 last year. Next in order this

Imports of Machinery

	(By Value)		Ten Months Ended	
	April, 1923	April, 1924	April, 1923	April, 1924
Metal-working ma- chine tools.....	\$19,483	\$34,909	\$305,009	\$328,910
Agricultural ma- chinery and im- plements.....	361,538	286,006	2,107,279	2,036,417
Electrical machi- nery and appa- ratus.....	23,863	36,118	165,906	342,008
Other power gen- erating machi- nery.....	265,924	96,029	1,795,707	482,084
Other machinery..	226,776	141,296	2,030,577	1,412,193
Vehicles except agricultural....	234,668	294,586	1,627,663	2,073,487
Total.....	\$1,132,252	\$888,944	\$8,032,141	\$6,675,099

Machine Tool Exports

	March, 1924		April, 1924	
	Quantity	Value	Quantity	Value
Lathes.....	49	\$70,937	48	\$86,850
Boring and drilling ma- chines.....	147	45,922	120	28,866
Planers, shapers and slot- ters.....	17	22,725	13	14,438
Bending and power presses..	25	25,669	32	22,471
Gear cutters.....	62	65,653	89	43,695
Milling machines.....	37	29,930	23	30,524
Thread-cutting and screw machines.....	37	41,566	38	32,570
Punching and shearing ma- chines.....	13	4,940	22	9,753
Power hammers.....	13	14,434	20	10,963
Rolling machines.....	17	11,944	1	275
*Sharpening and grinding machines.....	562	128,102	263	111,790
Chucks, centering, lathe, drill and other metal- working tools.....	2,282	21,821	3,631	23,088
Pneumatic portable tools....	768	60,766	1,428	105,156
Total.....	4,029	\$544,409	5,728	\$520,439

*Includes number of external and internal grinding machines only; "other sharpening and grinding machines" are reported now by weight instead of value.

year were typewriters, \$12,001,416; mining and quarrying machinery, \$9,264,039; sewing machines, \$8,517,993; electric machinery, \$7,703,653; textile machinery, \$7,045,276, and pumps, \$6,428,239.

Proposed Contract for Furnishing Ore to the Ruhr District

With the arrival of Roy M. Wolvin, president of the British Empire Steel Corporation, in Germany last week, it has been announced that the corporation has been asked by German interests to enter into negotiations leading up to a five-year contract for ore to be supplied to the Ruhr district. A tentative arrangement has already been made for shipments for the present year, but several of the large manufacturers, desirous of being sure of their position, request the corporation to submit proposals covering the next five years, so that they would know what deliveries they could depend upon from Canada, and following this, conclude their arrangements for supplementing them from other parts of the world. For many years these ore shipments have formed one of the most important undertakings of both the Dominion Iron & Steel Corporation and the Nova Scotia Steel & Coal Co., both of which are included in the British Empire Steel Corporation, but an entirely different situation arose when the French entered the Ruhr and put an end to contracts that had been in force up to that time. The basis entered for the year 1924 has led British Empire Steel interests to believe that a long contract can be made on terms that will prove remunerative to the corporation and help it to take care of a very large proportion of fixed charges. It is expected that new contracts will involve upward of 500,000 tons of Newfoundland ore.

St. Louis Blast Furnace Financed

Financial arrangements have been completed for the construction of a blast furnace and power plant at the St. Louis Coke & Iron Co. plant at Granite City, Ill., at a cost of about \$2,500,000, according to an announcement by W. G. Maguire, president. The company now has one blast furnace and 80 coke ovens.

The Apollo Metal Co. of La Salle, Ill., manufacturer of nickelzinc, plans to triple its capacity by the construction of an addition to the present factory. Work will be started shortly on the enlargement which will make 19,000 sq. ft. of floor space available. Since 1915, when the company was formed, its output has been increased to seven times the initial capacity. Edward Carus is president. The Mattheissen & Hegeler Zinc Co., also of La Salle, will erect a new strip mill at a cost of \$250,000, which will give employment to several hundred men.

Purifying Iron Ore by Chemical Methods

Results of Recent Work on Delaware Greensands Using an Acid Leach with Subsequent Washing for the Separation of Iron, Potash and Alumina

BY A. J. MOXHAM

MR. MOXHAM, who built and operated the Lorain Steel Co. plant at Lorain, Ohio, in the eighteen-nineties and later was president of the Dominion Iron & Steel Co., Sydney, Nova Scotia, contributed to THE IRON AGE of Jan. 4, 1923, an article on "Chemical Methods of Iron Ore Purification." It gave details of work he had carried on for several years, using first the Oriskany ore of Virginia and later on low grade New Jersey ore. Two years ago operations were transferred to Odessa, Delaware, where Mr. Moxham built a small operative plant to work upon the Delaware greensands, which are part of one of the largest deposits of low grade iron ore in the country. The present article tells of recent encouraging progress in the enterprise, which has for its object the winning of raw materials for steel, aluminum and fertilizers.

ABOUT a year ago the writer outlined certain methods of chemical purification of iron ore and stated that as a result of these experiments the company had constructed a small plant to work the Delaware greensands. We had shown that the process offered as a prize all the different constituents in the ore. As potash is present in the greensand, as an element additional to those of the usual iron ores, and as almost all of our potash is at present imported into this country, there seemed additional incentive for the effort. Still further, as an ore problem the greensand is located in the eastern United States, the largest steel market in the world. This Eastern market is now getting its ore from Chile on the south, or as an alternative from the Great Lakes, both exacting heavy freight, to be possibly saved.

Raw Material for Three Industries

It may perhaps be remembered that the ultimate goal of the process is that of raw material for the three industries, viz.:

1. For steel.
2. For the manufacture of aluminum.
3. For fertilizers, the present making of crude chemicals being only incidental to the route adopted to reach this goal. This in explanation of the fact that we are just now cobbling with chemicals.

We first tested our methods to the point of successfully making the potash alum, the copperas, and the aluminum hydrate (and consequently the aluminum sulphate), together with sulphate of potash. Having done this we put operations on a quantitative basis.

Leaching Without Fuel

In some months we got the leach routine into satisfactory control. Without useless technical detail, we might point out that the additional presence of the potash acted as a new variant, in the matters of both our solubilities and temperatures. This we looked for, but with the new combination of sulphates we found unforeseen differences. Many of these were to the good.

For instance, we learned that the sulphatizing reaction, while sluggish below the temperature of say 80 deg. C., and calling for fuel, became energetic on reaching or exceeding this temperature. We at first depended upon exhaust steam to secure the critical temperature, but found that when adding the water to dilute the acid, if we added it in the proper way and amount we could secure this critical temperature by its union with the acid.

The reaction being exothermic, once properly started develops its heat eagerly during the sulphatizing and proceeds to completion with speed. It is like striking a match to light a candle.

It is necessary to secure specific concentrations of the pay solution of the leach before crystallizing, and also, in order to keep the solution sufficiently liquid for good filtration, a good margin of solution heat was called for. Both of these are secured by the reaction described.

The sulphatization completed, the next step was to reduce the ferric sulphate present into ferrous by the addition of iron scrap. We also found that when this addition is made above the critical temperature the same speed of reaction and development of heat follows—so much so, that care must be taken to keep the leaching tanks from boiling over. During the reducing, the temperature will steadily go up as the solution concentrates. We have found it quite possible to secure a specific gravity of 1.50 in our leach solution together with a temperature of 105 deg. C.

By thus cooperating with the nature of the reaction, we have eliminated the item of fuel. We have also reduced the time. It is believed possible to complete the actual leaching in three hours or even less. We originally took as long as 48 hours and were well satisfied when able to reduce it to 6 hours.

Efficiency

We can secure over 90 per cent efficiency. The following leach is given as typical:

Leach No. 53. Ore Charged 2200 Lb.

Ingredient	Lb. Charged	Lb. Recovered	Efficiency of Pay Solution
Iron	242	226.6	93%
Alumina	133	130.2	98%
Potash	107	107.00	100%

Acid leach.
Average temperature, 99 deg. C.; sp. gr. at end of leach, 1.44.

A typical residue from a leach of 2300 lb. of ore gave the following:

Ingredient	Lb. Charged	Lb. Left in Residue	Percentage Lost in Residue
Iron	247	6	2.3
Alumina	131	10	7.3
Potash	110	9	8.3
	488	25	Average 5.97

Note: The percentage used is based on the amount in the charge in both cases.

But plain sailing did not continue. Proceeding to the next step, clarifying the solution, our troubles commenced. We lost our tonnage. We should state that the sulphate adhering to the residue was washed in

water. It was at this time kept in the system by being added to the pay solution. We were making at will two kinds of leach, viz., the neutral leach, using an excess of ore, and the acid leach, using an excess of acid. We found the neutral leach gave us the poorest product. It gave us also the slowest filtration, as it developed so large an amount of suspended matter or "gel." The leaches with an excess of acid did not give us the same trouble. At first with small product the total amount of "gel" even in the neutral leach was not so noticeable, but as the charges got larger and as we increased the neutrality the "gel" increased.

In a couple of weeks filtration was blocked. Only a small amount of the pay solution got through. At first, believing filtration at fault, there followed a study along this line. We largely improved matters by sundry methods. For instance, we could coagulate the "gel" with glue and get good results by settling, provided that we diluted the solution to a low specific gravity, say from 1.05 to 1.08. But this meant the cost of evaporating a large amount of water in the subsequent concentration, and while the settling was effective it increased the amount of "gel."

We did well by using a solid basket centrifuge to rough out the sediment in connection with the super centrifuge as a finishing clarifier, and finally we could handle it with the pressure filter.

We could largely reduce the "gel" by taking out the very fine stuff (say under 60 mesh) from the ore before leaching. But this fine stuff is richer in pay material than the rest, and we had to take out about one-third of it all. Each of these methods had disadvantages in cost of plant or of operation, generally of both.

The residues after leaching were washed, and we kept the washings in the system by adding them to the pay solution, as stated, not realizing till later the danger in doing this. This was the most convenient, and in view of the fact that all of the sulphates are soluble in hot water, trouble was not dreamed of.

Up to this stage we had devoted more time and study to the handling and filtration of the "gel" than to its cause. In view of the negative results obtained so far, the study into the cause was more seriously undertaken, with the hope of checking if not stopping the formation of the "gel."

The study was long. Remember, we were experimenting with two methods of leaching as well as with changes in solution and temperature and specific gravities. The problem of permutation, or a trial with the phase rule, will show that there can be conditions of freedom ad infinitum with all these variants.

The cause was finally found, by chance, rather than by research. The leach gave us a ferric sulphate solution. The writer, during the night, was following some tests for flocculation in a dilute solution, that had been standing some days. There came a change in the reflection from the surface of the liquid in the tank, caused by one of the electric lights going out, which gave just the exact shadow needed for good inspection. The cause was at once in evidence.

It was hydrolysis. No one who has cobbled with ferric sulphate dissolved in an excess of water can mistake the distinct coloration and appearance of the hydrolysis of this sulphate. It is *sui generis*.

Hydrolysis Confirmed as Cause of "Gel"

To confirm the indication a study was at once undertaken of the effects of excessive water. The results were quickly confirmatory. Exposure to an excess of water for considerable time always develops an increase in the "gel." The following speaks for itself:

Effect of Diluting Pay Solution from sp. gr. 1.354 Down to sp. gr. 1.07, Using Large Excess of Water, and Allowing It to Stand About 48 Hours. Percentage of Ingredients in the "Gel"—Dec. 5, 1923

	Before Dilution. Percentage of Ingredient After Leach (Based on Original Amount Charged)	After Dilution. Percentage of Ingredient (Based on Original Amount Charged)	Increased Percentage in "Gel" Due to Greater Excess of Water
Iron	38.8	77.7	100
Alumina	6.5	12.8	100
Potash	35.9	53.1	48

The greater increase in percentage of iron and alumina indicates clearly hydrolysis.

Also it is to be noted that the relation of the ingredients, before the water was added, gave the proportion belonging to the sulphate, so the material must have been originally leached out as sulphates. Hence, the change can only be due to hydrolysis, aided by adsorption.

Again, take the following, in which hydrolysis is shown by the increase of "gel" due to added water. Note also the effect of free acid:

No. 1, amount of "gel" in the original leached solution.
No. 2, amount in the same solution with acid 10 per cent and water 90 per cent added.
No. 3, amount in the same solution with same amount of all water added.

Solutions	Sp. Gr.	Weight Units of Solution	Weight Units Hydrolyzed "Gel"
No. 1, as leached	1.35	135	18.52, or 13.72%
No. 2, acid and water added	1.08	135	19.91, or 14.75%
No. 3, water only added	1.08	135	25.22, or 18.68%

This seems conclusive because, in the case of the addition of a mixture of 10 per cent acid and 90 per cent water there is scarcely any effect upon the "gel," whereas the addition of the same amount of water without any acid at all increased the "gel" 36 per cent (from 13.72 to 18.68 per cent).

Still further, the table below shows the effect of washing a neutral solution together with subsequent boiling; free acid absent. The leach was No. 50, Oct. 12, 1922. Although the original extraction was in the form of sulphates, and therefore soluble, excessive water used in the washing would by hydrolysis make the salt insoluble. In further water treatment, if the salts had remained sulphates (which are soluble in water), boiling would have dissolved the salts and reduced the amount:

Analysis of the "Gel"

	After Treatment with Excess Water	After Second Extraction with Boiling Water
Iron	18.461%	19.224%
Alumina	3.144%	3.497%
Potash	6.200%	5.839%
Total pay salts	27.805%	28.560%

The first excess water treatment hydrolyzed the sulphates and rendered them insoluble, so further water did not dissolve them.

As might have been expected, the iron contents in the "gel" were increased in greater proportion than the other ingredients. We have had cases wherein after the leach had performed its work, with the result that over 90 per cent of the pay stuff was in solution and the solution was then diluted from a specific gravity of 1.35 to a specific gravity of from 1.10 to 1.05 (in order to coagulate and settle the "gel" with glue) the "gel" formed was found to contain as much as from 70 to 80 per cent of all the Fe in the original ore.

The Remedy

The determination of the cause solved the problem. Manifestly we could not give up the washing of the residue without leading to waste, but it was equally manifest that we need not add the wash water to the pay solution, where it had the whole wealth of the leach to hydrolyze and convert into "gel." So the wash water is kept out of the leach solution and is now used to dilute the acid in the following leach.

In other words, the hydrolysis is limited to the small amount of the pay solution adhering to the residue and it is kept away from the pay solution itself. The hydrolyzed material from the residue exists in the form of suspended matter together with the free acid in the wash water and it is carried forward therewith into the acid of the subsequent leaches and is there reclaimed and so waste is avoided.

Precipitation of the Alumina as Hydroxide

A neutral leach, which means the elimination of free acid, having now become practically available, we were able to carry the reduction of the ferric sulphate to its logical result and with economy.

We further discovered that by adding the iron in excess (in the form of scrap), after the reduction of

the ferric to ferrous sulphate was complete, aluminum hydroxide came down as a precipitate. This resulted in an effective means of separating the alumina.

We had no inclination to go into the higher chemical industry, where the process is costly and both market and product are small, because we believe that our method will find its greatest profit in the larger, even if cheaper, scope of the commercial quality products. To make commercial sulphate of alumina, all that is necessary is to add sulphuric acid of the proper dilution again to the now separated alumina hydroxide. Whereas if alumina is preferred, it is obtained by driving off the SO_2 with heat and condensing it as fuming acid. Either method keeps us in the domain of both large product and large market.

The mother liquor now left consists of sulphate of potash and of copperas. We separate these by fractional crystallization.

We thus get our alumina (or sulphate of aluminum as desired) by precipitation, our sulphate of potassium by fractional crystallization, and the copperas as the final result. We have only one fractional crystallization. All the products are of commercial quality and belong to the large tonnage market.

As a final encouragement we find that while the "gel" made is now in greatly reduced quantity, what there is of it has the property of reducing the sulphur in low grade oils. There may be found a value even in this product. The developments are now pointing to a tonnage product.

Ordnance Steel and Blast Furnace Problems

Selling Practice in Steel and Pig Iron Costs Among Subjects Presented Before Spring Meeting of American Steel Men

ABSTRACTS of three of the seven technical papers, which were presented before the annual spring meeting of the American Iron and Steel Institute, were published in THE IRON AGE, May 29. The titles of the three articles were "Hardened and Ground Rolls" by J. R. Adams of the Midvale Steel Co.; "The Cleaning of Blast Furnace Gas" by G. M. Hohl of the

Bethlehem Steel Co., and "Power Consumed in Rolling Steel" by Gordon Fox of Freyn, Brassert & Co., Chicago.

Abstracts of the four other papers, each dealing with a different phase of the steel industry as a whole, are presented on the following pages. Owing to lack of time discussion of papers was almost entirely omitted.

Selling Practices in the Steel Industry

BY ERNEST T. WEIR

ERNEST TENER WEIR, president Weirton Steel Co., Weirton, W. Va., author of the paper on "Selling practices in the Steel Industry," was born August 1, 1875 in Pittsburgh, where he has spent his life. He was educated in the public schools of his native city and in 1890 began employment with the Braddock Wire Co. as a clerk, and a year later became identified with the Oliver Wire Co., with which he remained until 1898. He went in 1899 to the American Tin Plate Co., where he was engaged a number of years, afterwards organizing the Phillips Sheet & Tin Plate Co., in 1905. Upon the death of J. R. Phillips in 1905, Mr. Weir became president. The name of the company was changed in 1918 to the Weirton Steel Co. The company made numerous additions and improvements until now it is on a basis of self maintenance from the raw materials to the finished product.



I WOULD like to say in the beginning that nothing in this paper is intended to suggest, much less to advocate, any collusion in the establishment of prices; I believe in free and legitimate competition and I know of no industry that is more competitive than our own.

I believe I am safe in saying that, with the majority of the steel companies operating now, there is a general efficiency in the operating and production departments of the business. I believe that as a rule the executives of the companies give constant and detailed attention to this branch. Costs are carefully scrutinized, production fluctuations carefully considered and the keenest competition established between different plants of the same company. . . . For these various reasons the executives as a rule, I believe, devote more time and thought and personal interest to the question

of manufacturing than they do to the problem of the merchandising of the product of the mills.

Attention to Sales

I believe in the first place that we executives do not give sufficiently detailed attention to the matter of sales; we put too much pressure on our sales managers to secure business and do not stress sufficiently the necessity of making a profit on every sale.

I find sales managers who point with pride to the fact that their plants are operating either full or beyond the average percentage of the whole industry and who pass over very lightly the fact that earnings are small or maybe invisible. Their task apparently is finished when the mills are supplied with orders, not profits.

Gentlemen, the time is here when the fundamental reason for the existence of our business—that is, to make a profit—must be considered on every sale, when the executive must himself see that the sales manager shoulders his share of this responsibility and pats himself on the back only when the order book is fat with profitable orders and not simply with orders for tonnage only. I am frank to say I believe that for this lack of constructive policy on the part of our sales people, the executives are to blame. In our anxiety to keep the wheels turning, we hammer the sales manager for orders, not profits.

Jurisdiction of Salesmen

I think often that we give our salesmen too much jurisdiction in the matter of prices. This may not be so dangerous with the salesman who knows his business through long experience and has some practical knowledge of the products he is selling, but with the general run of salesmen it is a dangerous and unprofitable method. By such laxity we invite the salesmen to be over credulous of the statements of the buyer about the price he can secure, for the salesman wants the order and when all he has to do is to report that he simply met competition and repeat what the buyer told him, he consequently does not have to work overtime to convince the buyer that his service and quality and price combined justify his receiving the order. Don't let our sales department degenerate into order takers, let us make them salesmen who sell *quality, service* and who secure a profit on the sale. The only man who is worthy of the name, salesman, is the one that always has this in mind and puts it over.

Breaking Contracts

Another matter that is of great importance and should have the serious consideration of the entire industry is the laxity with which our sales contracts are treated. It is a well-known fact now that contracts covering the sale of our finished materials are really nothing but options that the buyer can exercise or not as he sees fit; whereas they are a definite binding obligation on our part to supply a fixed tonnage at a fixed price if the buyer so demands. While in our contracts there is nothing that guarantees prices against decline, nor relieves the buyer from the necessity of taking his purchased tonnage, yet it has become an implied fact that, if the price of the commodity declines during the term of the contract, we immediately reduce the price and the buyer, as a rule, will refuse to specify the tonnage unless we meet this condition.

I have in mind particularly one very large buyer of a standard commodity who contracts with four or five different manufacturers always for more than he can possibly use; if the market strengthens and advances in price, he loads himself up; upon the other hand, if there is no advance or prices decline, he takes out only what he wants and then only when the price has been reduced to meet the lowest quotation. This man has absolutely no regard for the sanctity of his obligation and is, I am sorry to say, representative of too many buyers of steel products.

Under present methods of sale, the buyer is always pressing for lower prices, whereas such would not be the case if he had to carry out his contracts at the contract price.

For this condition, we manufacturers are alone responsible and it is causing the steel industry many millions of dollars in losses.

One of the worst things about this failure to observe the sanctity of the signed contract is that it unquestionably tends to weaken the fundamental morality of our business. There is one great exception to this condition, and that is among the larger oil companies: they still religiously adhere to the policy of fulfilling their contract obligations, and I yet have to hear of the first case in which they ask for reduction in price, no matter where the market goes. They purchase from you, sign the contract, take the material out and pay the contract price. If they can do it, why cannot other buyers?

I would like to recommend that our sales departments be carefully advised as to the real facts sur-

rounding the issuing of earning statements of the larger companies, when such statements are made public.

Statement of Earnings

For some reason the practice is to give out gross earnings; that is, earnings before deduction for interest, depreciation, depletion and so forth. The public generally fails to analyze these statements, consequently the gross figure becomes fixed in their minds as the one that represents the earnings available for dividends and development; consequently they have an exaggerated idea of the earnings of the steel industry.

One of the largest customers of our company recently made the statement to one of our district sales managers that, based on the Steel Corporation's last statement, the profits of the steel industry were entirely too great, and he took the gross figures for last year as the basis for his statements; this was reported to our general office, and we sent out a complete analysis of the figures showing the net earnings per ton, which satisfied him after analysis that the earnings per ton were nothing more than normal.

The steel industry and its situation is always of such great interest to the buying public that I think it is always important that they get not only the correct figures, but the correct impression; and for this reason it has seemed to me that it would be better if, when statements of earnings are made, the net figures be the ones that are emphasized and not the gross earnings.

I cannot end my remarks without referring briefly to one of our very serious problems in some of the branches of our industry, and that is the matter of disposing of our off-grade product; by this I mean seconds and other accumulations in sheets, strip steel, tin plate, pig iron, semi-finished steel, etc. Hardly a line but has its off-grade product problem today.

The tonnage produced in these off-grades is so considerable as to have become an important factor in the profit question. For instance, in tin plate it is estimated that between four and five million boxes per annum, or approximately 10 to 12½ per cent of the total production, is stock accumulation and sold from the stock sheets at varying prices, but always materially under the price of prime product.

We are all familiar with the importance of the production of seconds and off-grade material in mills manufacturing pickled finished sheets for various purposes. The accumulation at times becomes so great as to be very burdensome, and then the material is marketed and simply dumped at prices even below that of one-pass sheets and the consequent loss is very heavy. The same condition applies to every line that produces off-grade products.

Merchandising, Not Dumping

The term "stock accumulation," I believe, has become a misnomer, because all of this tonnage is actual production and should be so considered; and a proper effort made to merchandise it, not dump it.

I believe that this is a matter that the executives and sales managers could profitably give close attention to, for the purpose of, in the first place, reducing the production of these accumulations, and a careful survey should be carried on as to why off-grades are produced, and then followed up to keep the production down to a minimum figure.

I have recently come to the conclusion, after having this survey made in our mills, that in many cases we could profitably produce more scrap rather than this off-grade material. I think there are two reasons for this; in the first place, very frequently we send this material through the mill and all its processes and then sell it at tremendous loss, whereas we would have been better off to have simply scrapped it after the original process. In the second place, these large accumulations have a very direct effect on the price that we can secure for our prime product. Large tonnages of off-grade materials hanging over the market invariably weaken the buyer's ideas of price, and when our sales department offers to him this material at prices dollars a ton under

(Continued on page 1695)

Waste Heat in Open-Hearth Practice

British Steel Makers Discuss an American Paper at Annual Meeting—Furnaces of 500 Tons—Low Temperature Gases in Germany

Special Correspondence

ONE of the important papers delivered before the annual meeting of the Iron and Steel Institute in London, May 7 and 8, was entitled "Recovery of Waste Heat in Open-Hearth Practice" by W. Dyrsen, United States Steel Corporation, 71 Broadway, New York. The author's paper is a voluminous discussion covering 48 pages and it was fully discussed by various British steel men. The author gives a comprehensive summary at the conclusion of his paper which is as follows:

1. A complete detailed heat balance of fuel for a modern American 80-ton producer-gas open-hearth furnace is given. This balance shows that in good practice the waste gases from the checker chambers contain about 43 per cent of the heat in the fuel, and that by the use of a waste-heat boiler about 25 per cent of the heat in the fuel can now be recovered in steam.

2. A study is made of this heat balance, which shows that by the insulation of checker chambers and flues and by using valves with a small amount of water cooling, and by preventing an excessive amount of air from entering the checker chambers and flues, the steam output can be raised to correspond with about 34 per cent of the heat in the fuel.

3. It is shown that the heat actually used by the bath, in addition to the chemical and sensible heat in the charge itself, is small compared with the heat in the fuel, and is in ordinary practice, with hot pig iron, less than about 8 per cent, and with cold pig iron between 10 to 15 per cent of the heat in the fuel. The total heat losses from the open-hearth furnace system constitute, therefore, from 99 to 92 per cent in the ordinary hot pig iron process, and from 90 to 85 per cent in the cold pig iron process of the heat in the fuel.

4. Constructional changes in the open-hearth furnace, making it possible to obtain a still higher output of steam, have been considered. In the case of producer-gas, the elimination of the gas checker chambers is considered. It is pointed out that in many furnaces today the heat actually added to the gas in the checkers is small and that in such cases the gas checkers could be dispensed with, without increase in fuel consumption, and a gain in steam output would be the result.

5. The proposed practice of taking part of the waste gases from the melting chamber direct to the boiler is discussed, and it is shown that the heat in the waste gases from the melting chamber is far in excess of that required for preheating the air and gas, and that this proposed practice is fundamentally sound.

6. A heat balance is given for a producer-gas open-hearth furnace with the constructional changes mentioned in (4) and (5), and it is shown that as much as 40 per cent of the heat in the fuel may be recovered as steam.

7. A heat balance for a coke oven gas-fired open-hearth furnace is given for comparison with producer-gas as fuel, and it is shown that in percentage of the heat in the fuel about the same amount of steam can be produced from both fuels under similar conditions, but that the steam production per hour is less for coke oven gas.

8. The steam output for various charges is discussed, and it is shown that with an all-cold charge the steam output is only slightly less than with hot pig iron in the charge.

9. Further increase of steam output by the use of economizers is discussed; also a method for the recovery of radiated heat from the roof and port ends.

10. The construction of an open-hearth furnace, working according to the methods proposed in (4) and (5), is considered from a practical point of view. A practical method of diverting part of the extremely hot gases from the melting chamber direct to the

boiler without the use of valves and without large heat losses is given, also construction of port ends and checker chambers.

11. A comparison between blast-furnace and open-hearth practice is given, and it is shown that in average practice in steel plants the amount of steam obtainable from surplus blast-furnace gas and from waste heat in open-hearth furnaces is of about the same magnitude.

12. A practical method of cooling down the waste gases from the melting chamber to the checkers when required, or at the end of the heat, without the loss of heat units, is given. This method consists of introducing the proper amount of cool gases at the proper time into the waste gases in such a way as to protect the brickwork without the use of air or water cooling, and this method would give a higher average temperature to the combustion air during a heat without undue damage to the port ends and downtakes.

13. The economic value of the recovery of waste heat in steam in open-hearth practice is discussed.

Discussion

Lindsay Forster said that in dealing with the question of conserving heat, one of the chief difficulties was to get refractories which would stand up to the temperatures employed and that, if better refractories could be obtained, it would not be necessary to dispose of so much heat in water cooling and other means. He thought that gas regenerators, in some furnaces, would yield more heat in return for their maintenance than the author had allowed for.

He noticed that the author had got a higher final temperature in the chimney gases, and there were several differences there between the practice under the proposed conditions and that under the "excellent practice" conditions which would require very careful analysis.

Certain assumptions were made under the proposed conditions which were justifiable only on the theory that, with the furnace designed according to the proposals, better practice would be obtained. Such improvements did not arise from the constructional changes proposed but from the better working and control of the furnace. He asked if the author could divide the claims made for his proposed furnace into two sections: (1) improvements in the utilization of the heat which would arise from constructional differences and (2) those which would arise from improvements in detail or in working.

Benjamin Talbot asked for more detailed information as to the exact form of the gas and air ports in the furnaces now used in the United States. It was shown in the paper that 13.3 per cent of the heat in the fuel was lost in the cooling water. Did the ports contain dampers or valves which were used on the incoming side of the furnace to concentrate the gas and air at a higher pressure in a small concentric port? Something had been heard of such devices, and he would be very glad to know if they were used largely in America or in other words if they were a success.

Coke Oven Gas

Coke oven gas, if it could be used—and it was already employed to a certain extent—would be, said Mr. Talbot, perfect for the work, so long as it was satisfactory in the furnace. Considerable experience had been obtained in that regard in the United States, and so perhaps the author would be able to give a little information on the matter, which was of great importance. He would like to know several things about it. He supposed the gas was stripped of its benzol. Was it used

by itself, or was it necessary to augment it with some hydro-carbon such as heavy oil?

One of the most interesting suggestions was that the gas should be burnt without the use of regenerators. That had been tried in the past and the latest form of it was the Siemens new form furnace, but it could not be said that it had been used largely for steel making. It was true that, now that mechanical producers were available and that better gas producer plant could be obtained, gas might be burnt more efficiently without the use of regenerators that it could have been in the earlier days. But that might necessitate having the producers quite close to the steel furnaces, particularly necessitating the rebuilding of plants. It was suggested that if the gas were put in direct there would then be a surplus, which he supposed meant that the gas which was now being utilized in the gas checkers doing very little work would be free for, in the case illustrated, raising steam in the boilers. It might be thought that if that surplus were available, something else could be done with it, but there was no doubt that it would be available for the purpose in question and that it would enable more steam to be raised, provided that it did not result in any detriment to the steel furnace. As long as the fact that the gas did not pass through regenerators did not result in any detriment to the working of the furnace, that process would therefore be advantageous.

He, the speaker, had been impressed by the amount of dissatisfaction in the United States with the open-hearth furnace and he agreed with the author that "in order to reduce the fuel consumption per ton of steel, efforts must principally be made to produce more steel per hour."

Furnaces of 400 to 500 Tons

Before turning one's attention to waste heat, there were other economies which could be obtained. Mr. Talbot agreed that further reductions in fuel, wages, costs and repairs were possible if the size of the furnace could be increased, although he did not wish to see the size of the ladle correspondingly increased. When he spoke of increasing the size of the furnace he was referring to a very large increase, say to a capacity of from 400 to 500 tons. The production of a furnace of such a capacity with a comparatively shallow bath such as was necessary in steel making would exercise the inventive ability of furnace designers. Work was being done in that direction in the firm with which he was connected and they had built a furnace which tilted endways instead of sideways. The gas also was not reversed, but always ran in the same direction. That furnace had been running and had done such satisfactory work that it had been decided to test it to see if it would finish steel. The problem in that case—it had not been solved yet, but he was very hopeful of its solution—was simply a question of getting sufficient temperature of combustion; all other problems had been solved.

Three-Pass Regenerators

J. E. James, who was very much struck with the lucid way in which Mr. Dyrssen had marshalled his arguments, asked concerning the inefficiency of the present day open-hearth furnace. He desired to know whether the 3-pass regenerator referred to in the paper was in general use in the United States. If so, what was the life of the first pass of the 3-pass regenerator and, if the life were a good one, whence were the bricks obtained?

Another point in connection with the paper, which was very interesting, was the introduction of cold air into the uptakes of the furnace during the time that the heat was at its very highest. He would like to know whether he was right in supposing that the introduction of the cold stream into the chambers would be within the control of the melter, or whether it would be a sort of automatic time arrangement that could not very well be interfered with. It was well known that in ordinary open-hearth practice melters were loth to do anything which might rob them of the actual finishing touch required to make the steel satisfactory. He could easily imagine that, in applying such a device, one

would almost have to stand over each individual melter to see that he put it on and took it off at the right time.

Objections to Waste-Heat Boilers

H. M. Ridge recalled a statement made by W. R. Inglis, some years ago in which he put forward the very definite recommendation that metallurgical furnaces should be used for metallurgical purposes, and not for steam raising; he did not think they should be employed for raising steam beyond the absolutely irreducible minimum. If one increased the number of heat units which left the furnace with the waste gases and passed those gases to boilers and generated a large amount of steam, one could not control the time of the day at which that steam was raised; one was absolutely dependent on the operation of the furnace and that, in his experience, was most undesirable. It was better, he thought, to see what could be used to improve furnace conditions, irrespective of endeavoring to raise an extraordinarily large amount of steam. He thought that if the author's proposals with regard to the small amount of heat usefully employed in the furnace for its proper purpose were followed, it would result in the temperature of the steel furnace being dropped. One outstanding possibility of reducing the fuel consumption in the open-hearth furnace was to increase the intensity of the heat by increasing the pre-heating of the air to the absolute limit which could be obtained with the refractories available. For that purpose it was necessary, he thought, to go beyond the 760 deg. C. mentioned by the author as being the temperature of his producer gas, although that was in his experience extraordinarily high. That temperature, however, must be raised to the utmost limit attainable if a very large proportion of the gas was not to be burnt in the checker work of the regenerator.

Mr. Ridge asked whether the author had been actually able to use the horizontal 3-pass checkers satisfactorily with open-hearth steel furnaces. He himself had used a similar arrangement with the 3-pass checker horizontally, but he had not had the courage to put that apparatus on to furnaces in which the temperature was above 1350 deg. C.; in other words, it had not been applicable to open-hearth furnace practice. It was efficient for lower temperatures for recovery of heat, but subject to confirmation by the author he doubted if it could be used satisfactorily in connection with a steel furnace. He considered it was better practice metallurgically to carry on regeneration as far as possible and at the same time to avoid the waste-heat boiler except where it had to be employed.

E. H. Saniter expressed the opinion that the place to look for economy in the open-hearth furnace was in getting more steel rather than more steam. The crucial point in connection with any waste heat schemes was the temperature of the waste gases. At a temperature of 750 deg. a waste heat scheme might pay for itself and more, but no waste heat scheme would cover its capital expenditure if the temperature on entering the boiler was only about 400 deg.

F. W. Paul declared that it was feasible to work regenerative furnaces without the addition of checker work in the gas checkers—having tried it himself many times.

Gas Mixtures and Efficiency

Dr. Rosenhain said the temperature obtained and the length of the flame was not merely a function of the temperature of the gas or the air but depended very largely, in actual furnaces, on the intimacy of the mixture obtained, which was probably a function of the design of the furnace, as to the way the gas and air currents were made to mix. The usual method was to put the gas below and the air above to get a good mixture, but it did not always follow that that would be successful. A great deal depended on the speed of the gases, and in some cases, by merely accelerating the rate of flow of the gases, the temperature of the furnace could be increased and economy obtained, because economy partly depended on the time occupied by heating. After all, the amount of fuel used per ton of steel depended in part upon the length of time during which the furnace had to be hot while the steel was being melted.

In some cases that idea had been pushed to an extreme limit.

Blow Torch Furnaces

The idea of accelerating the speed of the gas had been pushed to the limit, in at least one American plant which Dr. Rosenhain said he had had the privilege of seeing recently, where the air was actually blown through the air checkers into the furnace under considerable pressure, and consequently a jet of flame almost like that of a laboratory burner on a gigantic scale was blown down on the bath. The life of the furnace was, of course, diminished, and it was very hard on the ports, but it was suggested that by keeping the flame down on the bath and away from the crown of the furnace a great many disadvantages were overcome, and undoubtedly the rate of melting was enormously accelerated. There was a large increase in the number of heats per day, and consequently it was claimed that there was a considerable increase in the number of heats during the life of the furnace.

The question of the non-application of regenerators to produce gas depended greatly on what the gas was. If one tried to use ordinary coal gas and pre-heated that, one lost enormously owing to disintegration of the hydrocarbons in the pre-heaters. With a poor producer gas, on the other hand, the amount of hydrocarbons present was almost negligible, even when it had not been stripped for other purposes, and so the chemical effect of pre-heating was negligible also. He spoke from actual experience on that particular point. Consequently, the thermal effect was fully attained.

Low Temperature Gases in Germany

O. Frick, referring to the question of securing economy in open-hearth furnace practice, said there were two ways in which that could be attained. It could only be secured, of course, by reducing losses, and losses were of two kinds: loss in escaping gas and loss by radiation. The loss by radiation could only be diminished by reducing the radiating surface and devising generators and so on with that end in view. There were two ways, he thought, by which loss due to escaping gases could be reduced. The author had confined himself to one of them—the use of boilers at the back of the furnace—and he thought that was a thing which could, and in very many cases should, be done but he would like to draw attention to another method, namely, the proper study and design of regenerators. There was no theoretical reason why escaping gases should be allowed to leave with a temperature of, say, 600 or 700 deg. C., as was usually the case. Only a few months ago he visited a steel works in Germany where the gases left at a temperature of 150 deg. C. He was not told, of course, how that was achieved, but it must have been done by scientifically designed regenerators. The result was that in melting down cold scrap for producing silicon steel, a process taking a large amount of heat, their coal consumption for a furnace making about three heats a day, or almost that, was down to 16 per cent. That, he thought, was an exceedingly fine figure, and he suggested that efforts should be turned in that direction.

Losses Due to Water Cooling

Dr. Hatfield said that the percentage loss of heat through water cooling was the price paid for something which was extremely valuable, namely, decreased cost of maintenance. Perhaps the author could put in concrete figures giving some information on that subject. If one attempted to economize in that direction, one could very well lose more than one gained in extra cost of maintenance. It was frequently stated that the open-hearth furnace was extremely extravagant. "Extravagant" was a relative term. It enabled steel to be made with 3.5 to 5 cwt. per ton of coal, and that must be considered quite a good performance, while the monetary value of that fuel balanced against cost of maintenance under certain conditions was very good.

He did not think there was much danger of those who operated large steel plants looking upon the open-hearth plant as a steam-raising one, and he agreed with the author that, after all was done that could be done, there was a quite considerable surplus of heat that

could be directed through steam-raising devices. In fact, it was his definite experience that, with the gases at 600 deg. C., there was room for an excellent use of waste heat boilers. He considered that the quality of structure (looking on the furnace as a relatively gas-tight structure) was what furnace-builders should concentrate most of their attention on at the present time. There was a tremendous waste of heat and loss of efficiency through indifferent structures.

The president, Sir William Ellis, said the paper had evoked a very interesting discussion, which one would like to see continued. In his presidential address the previous day he had alluded to the fact that the papers read before the institute were perhaps becoming a little too technical and not sufficiently practical, but the present paper exactly represented the type which, he thought, was particularly useful to the members—and that applied not only to the paper itself, but to the discussion of it. It was really of a very useful and practical nature, and the institute was very much indebted to its author, not only for preparing it but for being present that day. He proposed a vote of thanks to the author which was carried by acclamation.

Mr. Dyrssen, in reply, said it would take too long to reply to the discussion verbally, but he would do so in writing. He would like to say, however, that it had been a great pleasure for him to come to England on this, his first visit. He had had the opportunity of visiting Sheffield, where he had been greatly impressed by what he had seen, and he hoped to visit Middlesbrough and Newcastle and see still more.

BRITISH FOREIGN TRADE

Imports Continued to Expand in April—Exports Not in Large Volume

Expanding imports were the feature of the British foreign trade in iron and steel in April. The total for that month was 243,008 gross tons, or the largest thus far this year. They exceed considerably the average monthly receipts in 1913 of 195,264 tons, and are about twice the 1923 monthly average.

Exports in April were 341,292 tons, or the third largest this year, falling only a little short of the February exports. They were also less than the monthly average last year of 369,800 tons.

Comparative data for both exports and imports, scrap included, are as follows:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
January, 1924.....	345,455	162,611
February.....	341,511	223,102
March.....	299,691	212,512
April.....	341,292	243,008
Average per month, 1923.....	369,800	127,800
Average per month, 1922.....	295,980	82,215
Average per month, 1921.....	144,285	152,724
Average per month, 1920.....	274,221	128,685
Average per month, 1919.....	188,519	59,801
Average per month, 1913.....	420,757	195,264

More detailed data of the exports are as follows:

Principal British Exports, Gross Tons per Month

	1913	1923	1923 April	1924
Pig iron }	93,700	74,100	94,607	48,758
Ferroalloys }			16,648	14,424
Steel rails	42,200	25,700	25,609	9,503
Steel plates	11,200	17,700	13,802	14,216
Galvanized sheets.....	63,500	53,800	50,361	59,020
Steel bars, rods, etc....	20,900	31,500	26,678	22,434
Tin plates	41,200	48,800	41,015	49,542
Black plates and sheets	11,700	29,500	24,491	17,285

Exports of scrap iron and steel in April were 4493 tons, compared with 9815 tons per month in 1923 and with 12,880 tons per month in 1922. In 1913 they were 9600 tons per month.

Data as to importations of importance are as follows in tons per month:

	1913	1923	April 1924
Iron ore	620,000	487,580	364,111
Manganese ore	50,100	43,420	30,197
Pig iron and ferroalloys..	18,000	9,157	33,191

Imports of semi-finished steel for January, February, March and April were 317,953 tons, compared with 194,066 tons for the same four months in 1923. Of this year's total 153,501, or nearly half, came from Belgium.

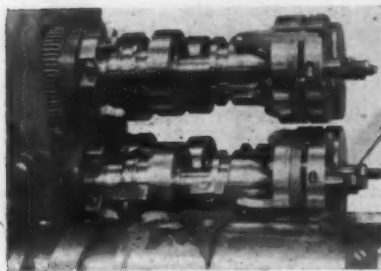
GRIDLEY CHUCKING MACHINE

Multiple-Spindle Unit for Large and Accurate Output—Air-Operated Chucks a Feature

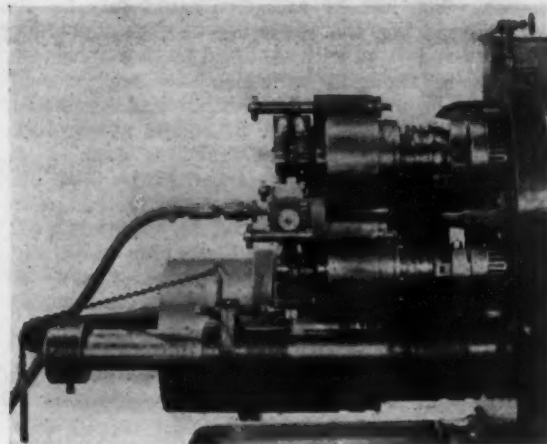
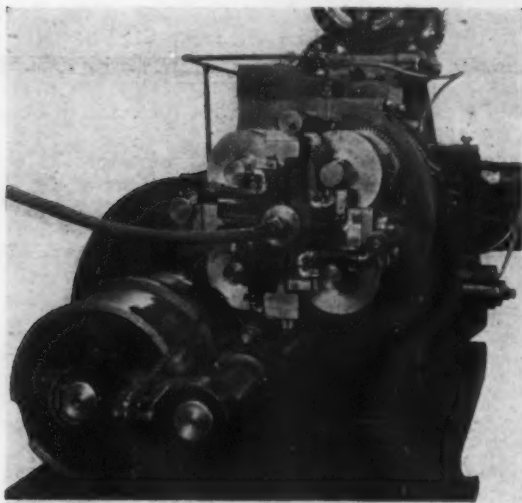
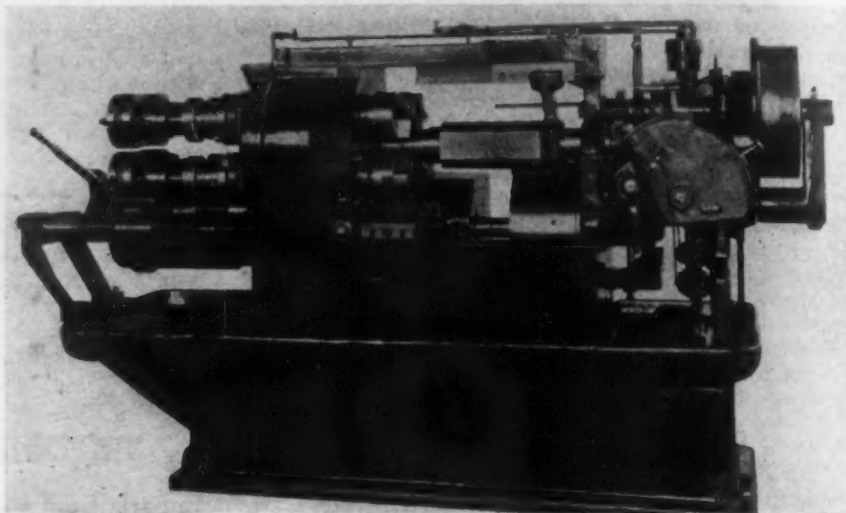
The National Acme Co., Cleveland, has added to its Gridley line the 4½ in. production chucking machine illustrated, which is designated as model H, and has been designed for maximum machining production to precise limits of a wide range of forgings and castings. Automatic chucks, actuated either pneumatically or

and forth. Behind the air cylinder is a four-armed spider casting fastened to, and revolving with, the spindle carrier. At the center of the spider is a swivel connection to which the hose is coupled. From the point of this connection radial ducts pass through the four arms of the spider to the valve chambers.

The valves themselves are revolving disks which in gripping position turn compressed air into the front of the cylinder to close the chucks, and in releasing position turn it to the rear of the spindle to move the piston in the opposite direction and open the chucks,



Multiple Spindle Chucking Machine. End view showing connections for automatic air chucking is below and view showing application of air magazines is at the lower right. The spindles as equipped for mechanical chucking where air is not used is shown above



mechanically, at the option of the purchaser, are features facilitating the operation of the machine.

The machine follows the basic design of the Gridley multiple-spindle bar machine as far as the type of work for which it is intended will permit. The Gridley turret arrangement consisting of a spindle carrier with turret slide upon an integral stem is utilized, and is said to assure rigidity and permanent accuracy in the new machine. The Geneva stop revolving mechanism, also used, is considered to be particularly suited to the chucking machine.

The outstanding feature is the chucking mechanism, which is built around the standard air chuck employed in the Gridley single-spindle automatics designed for chucking work. The chucks most frequently used are of the sliding three jaw type, and the jaws are actuated by gear teeth on the short arms of pivoted levers, the long arms of which are connected in the same manner to the end of a draw bar passing through the spindle.

Mounted on the rear of each spindle is an air cylinder, the piston of which operates the draw bar back

at the same time releasing the pressure from the opposite end of the piston. The air enters the cylinders through swivel connections on their axes, which in order to allow for floating motion, are connected with the valves by heavy rubber tubing. The rotary valves are actuated by plunger racks sliding parallel to the spindle, and meshing with pinions on the valve stems. Normally these plungers are kept pushed to the rear by coil springs, and while in this position hold the air pressure in the front of the cylinders, thus keeping the chucks closed.

One Spindle Stops Automatically for Loading

Another outstanding feature is the provision for automatically stopping one spindle at a time for loading, while the other three spindles continue to run. When a spindle comes into the lower rear position, this mechanism operates, bringing the spindle to a standstill so that the chuck may be unloaded and reloaded. This mechanism consists simply of a special spindle gear free on the spindle, with a cone clutch seat in a large hub at the rear. Keyed to the spindle, and fitted

into the cone clutch seat, is a bronze clutch ring, behind which there is a special finger holder. In the latter are pivoted three operating fingers, the front ends of which bear against the chamfered rear face of the clutch ring, while the rear ends work in conjunction with a clutch operating spool. Both finger holder and spool are keyed to revolve with the spindle. As the clutch operating spool is pushed forward, it spreads the fingers which in turn react upon the clutch ring to seat it into the spindle gear, thus driving the spindle. When the spindle is withdrawn, the fingers collapse, and a set of spring plungers within the spindle gear unseat the clutch ring. This disconnects the spindle gear from the spindle, and when the spool is withdrawn, its rear face bears against another set of spring pins in the back of the air cylinders which act as brakes to bring the spindle to an immediate standstill.

When a spindle comes into the fourth position, this action takes place, a cam on a drum at the rear of the machine coming into play to move back a slide which in turn withdraws the clutch operating spool and stops the spindle containing the finished work. As soon as the spindle stops, another cam on the same drum acts to move forward a similar slide which pushes down the plunger of the valve mechanism and so releases the work. The spindle remains stationary with the clutch open long enough to permit of loading the chuck, upon which the cams continue their action by releasing the valve plunger, which causes the chuck jaws to close firmly upon the work. As soon as this occurs, the other set of cams moves the clutch spool forward, starting the spindle, and the machine indexes.

The lever for engaging the feed may be operated from either front or rear of the machine. In setting up the machines, the air chucks may be operated in any position by a wrench on the squared ends of the valve stems beyond the pinion, permitting removal of the work for examination.

Machine Arranged With Mechanically-Operated Chucks

In the mechanically-operated chucking machine, the air cylinders are replaced by a special finger holder and cushioned reaction plate actuated by a second spool similar to that used in conjunction with the clutch. The finger holder is mounted on the chuck draw bar behind the end of the spindle. In front of this, and screwed to the end of the spindle is the reaction plate, which is a double disk made up of a hardened member against which the fingers bear, and a second disk

which carries this upon springs. The finger holder and these two disks are tied together by bolts, the hardened member being free to slide upon these bolts between the other two members. A number of stiff springs in sockets in the member screwed to the spindle keep the hardened disk slightly separated from its mating member.

The spool which operates the chuck is actuated by cams on the rear drum of the machine, as shown in the illustration, and slides upon the spindle in front of the cushioned reaction plate. When it slides to the rear, it spreads the fingers which extend through slots in the reaction plate. As this takes place, the short arms of the fingers react upon the face of the hardened disk which up to a certain point ordinarily pulls the finger holder back, moving the draw bar with it and closing the chuck. When the piece to be chucked is irregular the cushion springs come into play, toward the end of the closing action of the fingers, and permit the hardened disk to depress slightly. This is claimed to take the place of the elasticity of the air and assure firm chucking without crushing the work or straining the mechanism.

Positive Opening of Chuck

The draw bar is pressed constantly toward the spindle nose by a heavy coiled spring in a pocket in the rear end of the spindle, tending to open the chuck when the fingers collapse. Positive opening is also assured by a slide similar to that which opens the air chucks. This slide is actuated by a cam on the drum at the rear and carries an arm which presses down upon the end of the draw bar extending beyond the finger holder. Adjustment of the chuck jaws through their entire range is provided by nuts upon this rear end of the draw bar behind the finger holder.

The machine has no cross slide for the third and fourth positions, but otherwise the machine is capable of carrying out the operations of the Gridley multiple bar machine, including threading in the third position.

A shelf is placed in the fourth position for convenience in loading, this acting also as a guard to cover the cross slide drum. The largest chuck which this machine will swing is 6½ in. outside diameter, with a chucking capacity of 4½ in. The longest tool-slide feed available is 5 in., but this will only be available in special cases. Special chucks, chuck jaws, or collets may be furnished to fit the work which has to be handled.

Floor Grinder for Heavy Duty

The Cincinnati Electrical Tool Co., Cincinnati, has added to its line the 5-hp. heavy-duty floor grinder



The Machine Will Carry Wheels Up to 18 In. in Diameter and 3 In. Face. The motor is ball bearing

shown in the accompanying illustration, which has been designed for use in railroad shops, foundries, structural iron and other shops where heavy grinding is required.

The motor is ball bearing mounted and is fully inclosed to prevent emery dust and dirt from getting into the bearings and windings. The ball bearings are locked to the shaft in a manner intended to provide for end thrust and also eliminate wear and friction. The machine will carry wheels up to 18 in. in diameter by 3 in. face. The wheel guards are of the exhaust type complying with safety standards and are adjustable for wear of wheels. Removable covers are bolted to the guards completely inclosing the sides of the wheels, flanges and nuts to assure safety to the operator at all times.

The starting switch is of the magnetic type, push-button control and is mounted accessibly on a separate panel within the column. The grinder is available for alternating current 220 and 440 volts, 25 to 60 cycles, two or three phase.

Of the 16,919 gross tons of pig iron imported in March into the United States 3555 tons came from France and 1850 tons from India. China also sent 850 tons. Over 8000 tons of the total imports came in at Pacific ports.

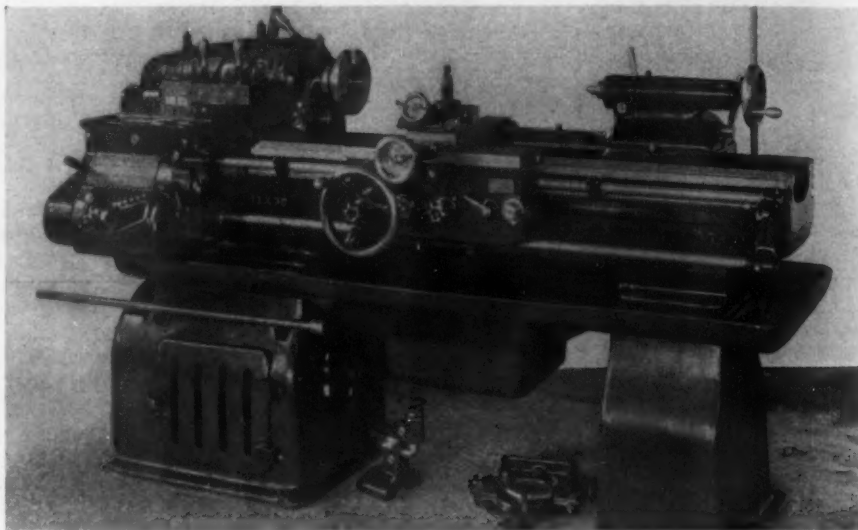
The Charcoal iron blast furnace of the Charcoal Iron Co. of America at Ashland, Wis., recently resumed operations after having been shut down for nine months.

Another Size Added to Pratt & Whitney Lathes

A 13-in. model B lathe, which incorporates several noteworthy improvements, has been placed on the market by the Pratt & Whitney Co., Hartford. As in the case of the 16 in. model B lathe, previously described, the smaller machine is newly designed throughout and quietness, strength, durability and accuracy are features emphasized. The lathe swings $13\frac{1}{2}$ in. over the bed and is available in two lengths of bed, 6 ft. and $7\frac{1}{2}$ ft. The maximum distances between centers are 32 and 50 in., respectively, for the geared head and 30 and 48 in. for the cone head.

The lathe is designed primarily for motor drive. Mounting the motor in the cabinet leg beneath the head-

Mounting the Motor in the Cabinet Leg Beneath the Headstock Is Intended to Place It Out of the Way and, Being Below the Center of Gravity, to Eliminate Vibration from this Source. The back gears are beneath the spindle, a location which eliminates overhanging parts. Convenient control of the machine is a feature



stock is intended to place it out of the way and being below center of gravity to eliminate vibration from this source. A 3-hp. motor is recommended, the regular equipment including also push button control, low voltage protection and full electrical equipment.

The drive is by belt to the main drive shaft, from which gears transmit the power to the headstock and feed mechanism. A standard Johnson friction clutch which runs in oil and is operated by a control rod running the length of the bed, is used for starting and stopping the machine without stopping the motor.

The geared headstock is the same as that of the 16 in. model B lathe previously described. Speed changes are obtained by means of convenient levers on the front of the headstock, eight spindle speeds, ranging from 18 to 525 r.p.m., being provided.

Hardened and ground Maag gears of chrome-vanadium steel are employed in the headstock. The back gears are beneath the spindle and are operated by an eccentric lever beneath the spindle nose which gives them a vertical motion for engaging and disengaging. This location eliminates overhanging parts, and provides a compact headstock which permits the maximum amount of light to reach the work centers.

Single-pulley belt drive may be used also with the geared head. The machine is also available with cone head using a four-step cone pulley. The hole through the spindle is $1\frac{5}{16}$ in. diameter, and the taper hole in the nose is ground to a No. 13 Jarno taper.

The feed gear box is designed so that a rocker lever and a ratio lever work in conjunction with a direct reading index plate, and any desired feed or thread per inch may be instantly set by placing these two levers in the correct relation to the one plate. There are 36 feeds ranging from 0.0012 to 0.0665 in. per revolution of the spindle. Both a lead screw and a feed rod are provided. A small gear shifting device is arranged so that when the feed rod is being used the lead screw is idle and vice versa.

The apron is of the standard double-wall construction and bevel gears are not used. Spur gears and worm drives carry the longitudinal and cross feeds to the carriage. A thread chasing dial is provided to permit the lead screw nut to be easily engaged at any one of four positions per revolution without hunting around to pick up the thread. The handwheel on the compound rest is mounted at an angle to afford knuckle clearance, and to facilitate reading of the micrometer dial. Another feature of the machine is the tailstock with its wedge locked and graduated spindle.

To Reduce Hack Saw Varieties

WASHINGTON, June 2.—Basic sizes of hack saws offered by 15 manufacturers have numbered 460. A pre-

liminary study at a meeting of the hack saw manufacturers with the Division of Simplified Practice, Department of Commerce, showed that 95 per cent of the demand came from 47 of these sizes. Preliminary varieties have been recommended for consideration as basic sizes, the list including 45 specifications, each varying from the other either in length, width, thickness or number of teeth per inch. The sizes recommended range from 8 to 24 in. in length, from $\frac{1}{4}$ to $1\frac{1}{4}$ in. in width, from 0.025 to 0.065 in. thickness, and from 8 to 32 teeth per inch. Only five different thicknesses and six different widths are retained.

At the Tod foundry, Youngstown, the United Engineering & Foundry Co., Pittsburgh, cast on May 8 last the heaviest iron casting ever made in Youngstown, weighing 115 tons. It comprised a section of bed for a 44 in. x 76 in. x 60 in. twin tandem compound reversing engine for the Republic Iron & Steel Co. Total length of bed was 28 ft. $10\frac{1}{4}$ in., total height 20 ft. $2\frac{1}{2}$ in. and extreme width 12 ft. The new pattern required 14,276 ft. of pattern lumber, equivalent to one carload. The mold was made on floor. An excavation 15 ft. 6 in. wide, 36 ft. long and 12 ft. deep was made, removing 6500 cu. ft. of sand, equal to about five carloads. Special equipment cast for the bed and pit weighed approximately 55 tons, consisting of arbors, loam plates and the like. Molding was started April 2. In making this casting, a total of 649,100 lb. of raw material was handled at both cupolas and furnace.

At a meeting of the stockholders of the Ashtabula Steel Co., Ashtabula, Ohio, held May 28, it was decided to surrender the charter and dissolve the corporation. The company owns a plant east of Ashtabula in Ashtabula Township.

Machine for Milling Relieved Threads on Pipe Taps

The O. S. Bickford & Son Co., Greenfield, Mass., is offering a redesigned Bickford thread milling machine, changes in which are chiefly in the direction of increased weight and rigidity. The new machine and equipment weighs 1900 lb., which is 450 lb. greater than the former machine. It is of the single-pulley drive type and is for use in milling relieved threads on pipe taps, doing the work at a single revolution of the tap.

In this machine two center brackets are slidably mounted on a 3¼ in. steel bar which is arranged both to slide and roll in the machine. One of these, the tail center bracket, supports the small or point end of the tap, and also carries a pin that rides on the relief cam. The camshaft, which is parallel to the main bar, carries a long gear, and the latter drives, through an idler gear, the work spindle in the head center bracket. This spindle revolves the tap, the shank of which is carried on a screw center inside of the spindle. The cam and the tap revolve together, the rise on the cam producing the relief of the tap. One end of the camshaft carries a lead screw which is engaged by half nuts. As the lead screw revolves the tap is carried forward to give the lead to the thread.

The driving pulley is connected to the pulley shaft by a convenient lever. There are two worms on the pulley shaft, one of which has a single thread and drives the camshaft through change gears, the camshaft driving

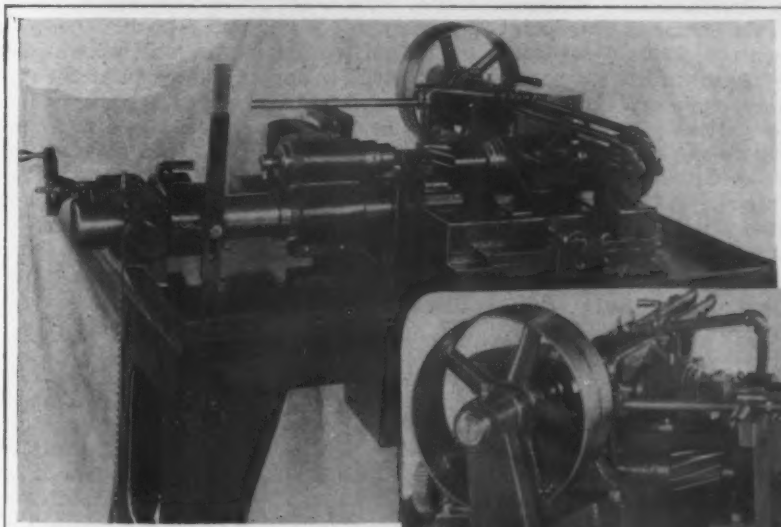
the feeding time is saved, and the production correspondingly increased.

The machine is driven by a 4 in. belt and it is claimed that with a carbon steel hob a 1¼-in. pipe tap may be threaded in 1½ min. and a 4-in. pipe tap in 8 min.

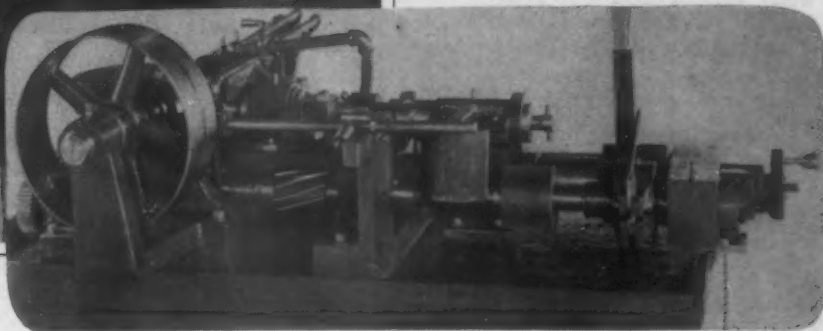
Nozzle for Bottom-Pour Ladles

The Ross Tacony Crucible Co. has been granted the exclusive right to manufacture in graphite a new design of nozzle for bottom-pour ladles. This design is covered by U. S. patent No. 1,426,136 held by W. H. Wills of the Atlas Steel Corporation. The special feature of this nozzle is the shape of the hole through the nozzle brick which is derived from that of the compound to be used in hydraulics. This type of tube for discharging water is one which converges to the minimum diameter, continues cylindrical for a short distance, then gradually diverges. Under proper conditions of pressure a discharge of a considerably larger volume can be obtained than through a tube with parallel walls. Where the coefficient discharge of the latter is less than 1.00, the coefficient of the former may be in some cases over 2.00. With heavy liquids, such as molten metals, the greater pressures would offset this larger coefficient to some extent. The following advantages are claimed with a nozzle of this design:

It is possible to pour a slightly larger volume of metal through this type than through a cylindrical one of the same minimum diameter. The stream is



A Relieved Thread Is Milled On Pipe Taps During a Single Revolution of the Tap. The machine may also be used for cutting the teeth on its own hobs, and for threading the shanks of pipe wrench jaws



the work. The other worm has a quadruple thread and drives a gear on the spindle carrying the hob cutter, and which threads the tap.

The machine may be employed to cut teeth on the hobs used on it. The spiral-fluted hob blank is held on a collar arbor between the same centers that hold the tap to be threaded. A master cutter for producing a single thread is mounted on the cutter spindle, and the pin on the tail-center bracket is set to ride the spiral cam. The lead screw is locked to the frame of the machine instead of to the camshaft, the result being a convolution on the hob, instead of a thread having a lead. The lead screw is then turned ahead one revolution by means of its hand crank and the next tooth is milled.

Another application of the machine is in the threading of the shanks of pipe wrench jaws, these being milled without relief. The threaded end of these jaws has two flat surfaces and two circular edges on which the thread is cut. For this work a special device known as the "quick-jump attachment" is available. The work turns slowly while the hob travels across one circular edge of the shank, and then turns quickly to a position where the hob begins cutting on the other edge of the shank. It is claimed that by this method one-half of

uniform and there is less tendency to spray, especially with partial openings of the stopper.

There is obviously less chance for a freeze up in case the metal is not superheated sufficiently, due to the short length of least diameter compared to the cylindrical type and to the divergence of the lower part.

There should be better chance of reopening the nozzle in case of a freeze up due to the divergence feature.

It can be produced at low cost and substituted for the present standard nozzle without material change in the ladle.

Cars loaded with revenue freight in the week ended May 17 totaled 913,407, according to the American Railway Association. This is about equal to the two preceding weeks, but is considerably below the record breaking figures of last year. For the first 20 weeks of the year the total is 17,823,118 cars this year, against 18,009,683 last year, and 15,059,800 in 1922.

Scrap iron and steel imports in March were 8375 gross tons, of which 3677 tons came from England and 4673 tons from Canada.

Mercury Vapor for Power Generation

Epochal Paper on Emmet Process Outstanding Feature of Spring Meeting Last Week of American Society of Mechanical Engineers

THE mercury vapor boiler and the process of power generation by burning a fuel under such a boiler, utilizing the vapor in a turbine-generator built for the purpose and then employing the spent mercury vapor for generating steam for use in a steam turbo-generator, were formally introduced to the engineering and industrial world at the Cleveland meeting, May 26, 27, 28 and 29, of the American Society of Mechanical Engineers. General information had been available of this development but it remained for the Cleveland meeting to make the authoritative presentation. The inventor, W. L. R. Emmet, consulting engineer General Electric Co., Schenectady, N. Y., submitted a paper, which not only was the outstanding contribution of the so-called spring meeting of the society, but was commonly referred to as the most portentous happening within the society since Frederick W. Taylor's paper "The Art of Cutting Metals," and thus the biggest event in two decades.

In other respects the meeting was like recent ones, characterized by a wealth of noteworthy papers so numerous as to demand four and five simultaneous sessions and leaving insufficient time to do justice to these as well as take advantage of the numerous industrial plants and examples of engineering interest which were open for inspection by the visiting engineers. The papers were naturally grouped under various professional divisions of the society, including among general subjects machine shop practice, materials handling, power in steel plants, management, interchangeable manufacture ordnance, etc. Some of these will be reviewed in these columns in the early future, but meanwhile printed copies of most of them are obtainable, some in full and some in abstract, at the headquarters of the society, 29 West Thirty-ninth Street, New York.

Officers Nominated

A brief telegram, printed in last week's issue, told of the vote by referendum raising the general annual dues to \$20 and the selection of Milwaukee for the spring meeting of 1925. On the last day of the meeting the nominating committee, which had canvassed eligibles for office prior to and during the first three days of the meeting, submitted the following slate of officers for election by mail ballot closing Sept. 23 to serve for the year beginning in December:

President, William F. Durand, professor and head of the department of mechanical engineering, Leland Stanford Jr. University, Palo Alto, Cal.

Vice-Presidents: Robert W. Angus, professor mechanical engineering, University of Toronto, Toronto, Ont.; S. F. Jeter, chief engineer, Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.; Thomas L. Wilkinson, consulting engineer, Davenport, Iowa.

Managers: John H. Lawrence, engineering manager, Thomas E. Murray, Inc., New York; Edward A. Muller, vice-president and general manager, King Machine Tool Co., Cincinnati; Paul Wright, Paul Wright & Co., Birmingham.

Treasurer, William H. Wiley, president John Wiley & Sons, Inc., New York.

Delegates to the American Engineering Council: Prof. W. F. Durand; William P. Hunt, president Moline Tool Co., Moline, Ill.; I. E. Moulthrop, assistant superintendent construction bureau, Edison Electric Illuminating Co. of Boston, Boston; E. N. Trump, construction engineer, Solvay Process Co., Syracuse, N. Y., and president Stumpf Uniflow Engine Co., Syracuse; William W. Varney, attorney at law, Baltimore; Ira Dye, industrial engineer, Seattle, Wash.; W. S.

Finlay, Jr., vice-president American Water Works & Electric Co., New York; Dean E. Foster, consulting petroleum engineer, Tulsa, Okla., and Fred R. Low, editor *Power*, New York.

Besides a business session there were 17 or 18 separate technical meetings to which were submitted between 50 and 55 reports and papers; there was a dinner meeting with addresses at Akron, Ohio, in a joint session with the Akron section of the society; an industrial preparedness meeting like one held some months ago in New York to show the methods followed by the War Department to mobilize industry quickly in the event of war; an evening at Nela Park, a university of light, as that remarkable research community maintained as the National Electric Lamp works of the General Electric Co. is known, and a visit to the Lorain works of the National Tube Co. The preparedness meeting was held in the name of ten associations, including the mechanical engineers, and Frank A. Scott, one of the managers of the society and president of the Warner & Swasey Co., presided. General C. C. Williams, chief of ordnance, U. S. A.; Dwight F. Davis, assistant Secretary of War, and Benedict Crowell, assistant Secretary of War during the war, were among the speakers, Bernard M. Baruch, chairman of the former War Industries Board, submitted a paper which was read by Mr. Crowell. The objects aimed at by the preparedness meeting have already been covered at length in *THE IRON AGE*. It was the demonstration for the public information of the more important and less well known group meetings being held about the country and going through what might be called dress rehearsals of the movements which a call to arms would require.

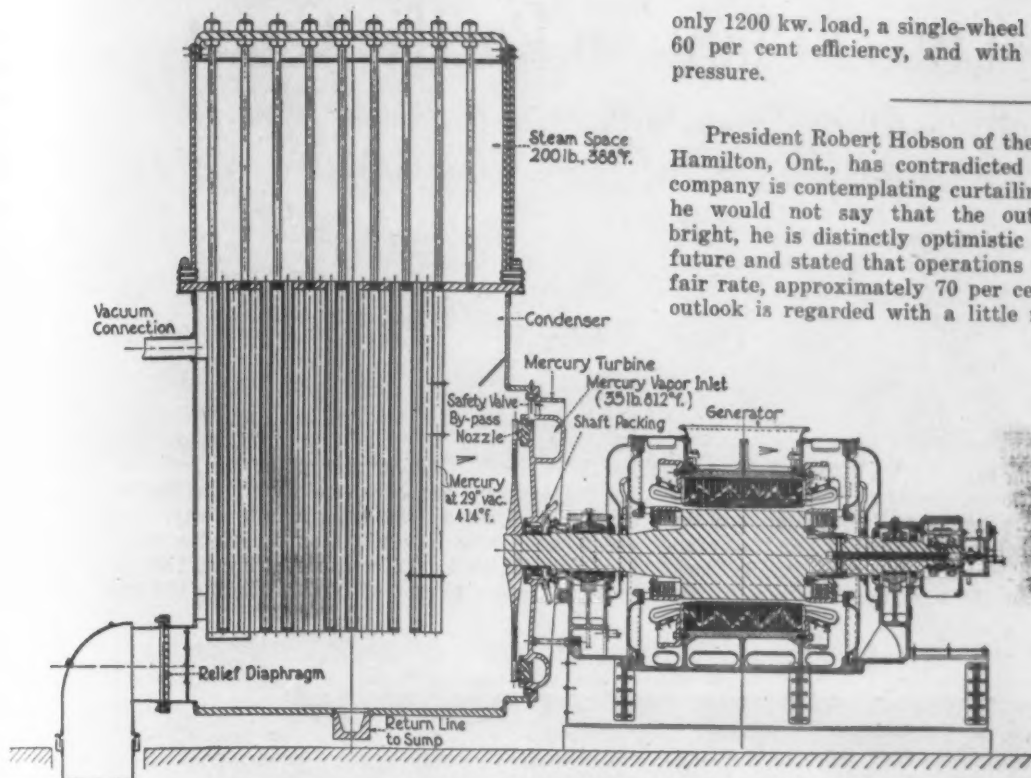
Emmet Mercury Vapor Process

As to mercury vapor process, "Estimates which do not admit of much error," according to Mr. Emmet, "indicate a possible average gain in output in three large central stations of 58 per cent had the fuel in these stations been burned under mercury boilers. Figures on which this estimate is based were obtained from operating data for the month of January, 1924, and show the gain in net output which would have resulted if the same quantity of fuel had been burned under mercury boilers; with the same auxiliary and flue gas conditions, it being assumed that mercury turbines with generators are 70 per cent efficient and that a mercury pressure of 70 lb. gage is used.

The Emmet paper describes the history of the mercury vapor process and the experiments which have been conducted at the installation at the Dutch Point station of the Hartford Electric Light Co. As soon as certain boiler experiments now in progress are satisfactorily completed it is proposed to build a new boiler of different type for the present plant at Hartford. This boiler will be adapted for a pressure of 70 lb. gage, the design pressure of the present boiler being 35 lb. gage. It is also intended to build a new three-stage turbine instead of the one-stage now used.

"When these changes are made it is hoped that this installation will be representative of types which can be repeated indefinitely on a large scale and with such resultant economies as have been outlined in this paper," Mr. Emmet says. Maximum economy will be obtained by bleeding the steam turbine in order to get as much heat as possible into the feedwater.

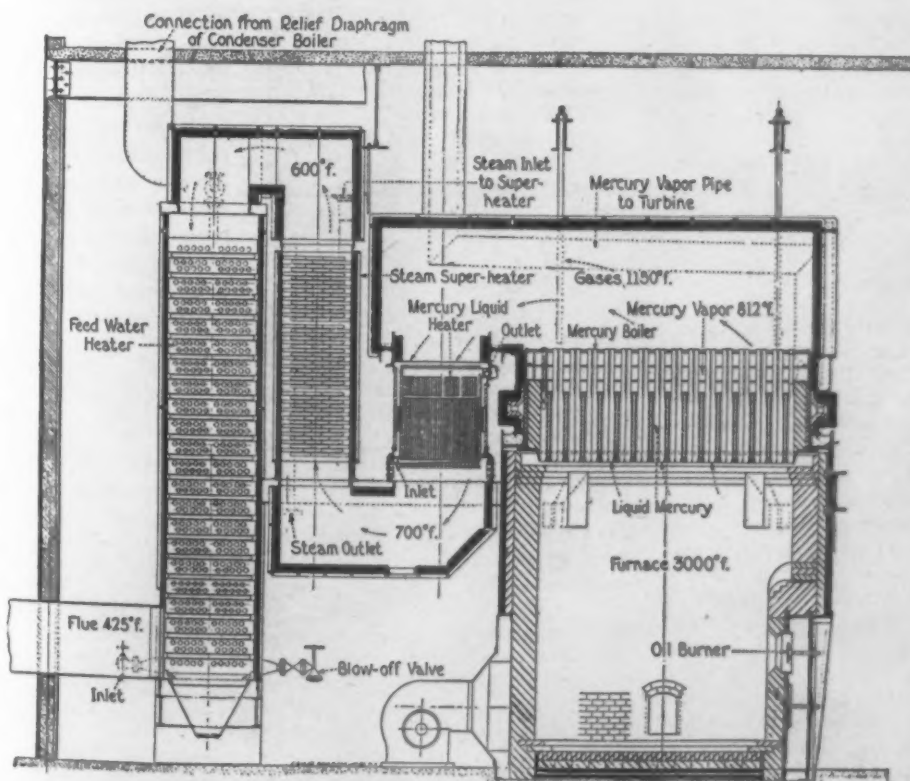
Since such units will not be run at heavy overloads, as is common with steam boilers during peaks, it will be practicable to put a large quantity of heat into the incoming air without burning the brickwork and it is



only 1200 kw. load, a single-wheel turbine of only about 60 per cent efficiency, and with only 22 lb. mercury pressure.

President Robert Hobson of the Steel Co. of Canada, Hamilton, Ont., has contradicted the rumors that his company is contemplating curtailing operations. While he would not say that the outlook is particularly bright, he is distinctly optimistic as to the immediate future and stated that operations were continuing at a fair rate, approximately 70 per cent of capacity. "The outlook is regarded with a little more confidence gen-

The Heating Surface for Boiling Mercury Is Shown Immediately Above the Combustion Chamber in the Lower of the Two Accompanying Illustrations



THE Vapor Is Made to Pass Through An Interchanger for Heating the Returning Mercury Liquid and Then Through a Super-Heater for the Steam Subsequently Evaporated and Finally Through an Economizer or Feed-Water Heater. This sectional drawing indicates the temperatures, one point of this binary vapor system being that with mercury high temperatures correspond to low vapor pressures. The mercury system is entirely closed with all joints welded. The mercury vapor after doing useful work in a turbine (indicated in the upper view) may still be at a temperature in excess of 400 deg. Fahr. and in a high vacuum, this temperature being sufficient to evaporate steam for use in a separate steam turbine. The spent mercury vapor condensed in the operation of steam-making returns by gravity to the mercury boiler for re-evaporation.

thought that such a device as the Ljungstrom air heater can be used to great advantage in bringing the flue gases to a low temperature and delivering their heat to the furnace. The heat from the furnace will be used to heat and vaporize mercury and to give such superheat to the steam as may be expedient with the steam apparatus used.

"With such an arrangement, if we assume 70 per cent efficiency, 70 lb. pressure for the mercury cycle, and the most desirable steam conditions, we should be able to operate on a base load at about 10,000 B.t.u. from fuel per kw. hr. In Hartford, where oil is burned and measured, and where steam flow and feed are both measured, it has been estimated that if the steam produced were used effectively, the fuel rate would be about 12,000 B.t.u. per kw. hr. This is with

erally," said Mr. Hobson. He also stated that a second blast furnace, which is now undergoing repairs, would be blown in within the next three or four weeks.

Manufacturing activity in April, as reported by the Department of Commerce, is given as 117, compared with 100 as the average of 1919. The falling off from the 123 in March was sharp and the present figure compares with 125 in April last year. Iron and steel is given as 116 in April, compared with 142 in March and 138 a year ago. Other metals show a high activity in April, represented by 166, compared with 132 in March and 145 a year ago, but this was due to low figures of 1919, rather than a great amount of business this year.

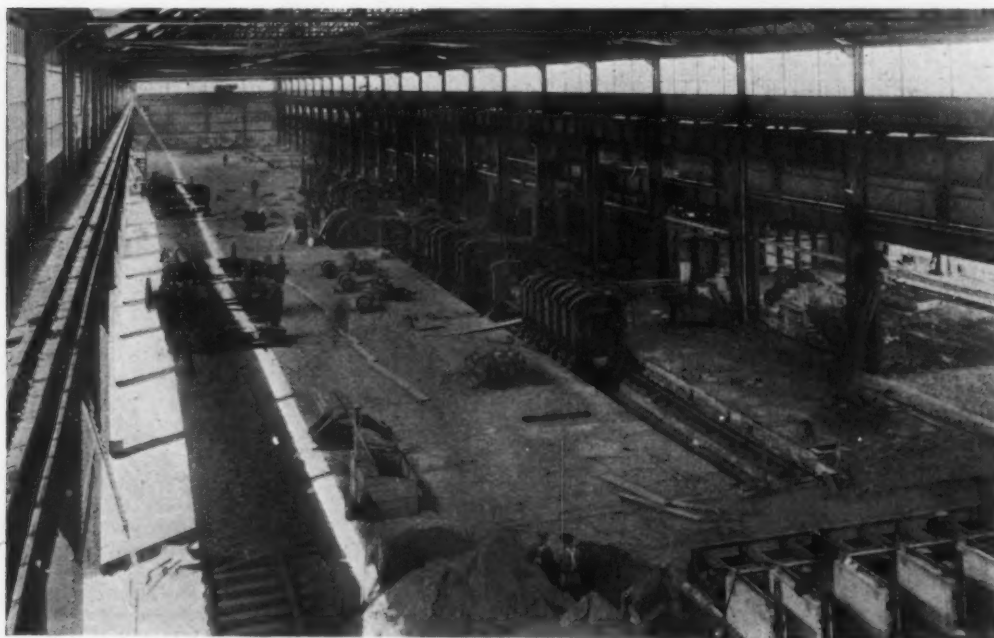
Sheet Steel Plant on Pacific Coast

Six-Mill Installation Recently Put Into Operation—Blue
Annealed, Black and Galvanized Sheets to Suit
Local Market

AMONG the new plants established on the Western coast of the United States to fill local requirements, as well as a growing export trade, the Pacific Sheet Steel Corporation has just put its new mill into operation at South San Francisco, Cal. The growth of the steel industry on the Coast has been due in part, probably, to the high cost of freight transportation. Its iron making capacity has been increased recently by the installation of the blast furnace plant of the Columbia Steel Corporation at Provo, Utah, and the enlargement of the steel making facilities of that company at Pittsburg and Torrance, Cal. The Pacific Sheet Steel Corporation plant is a further addition to the

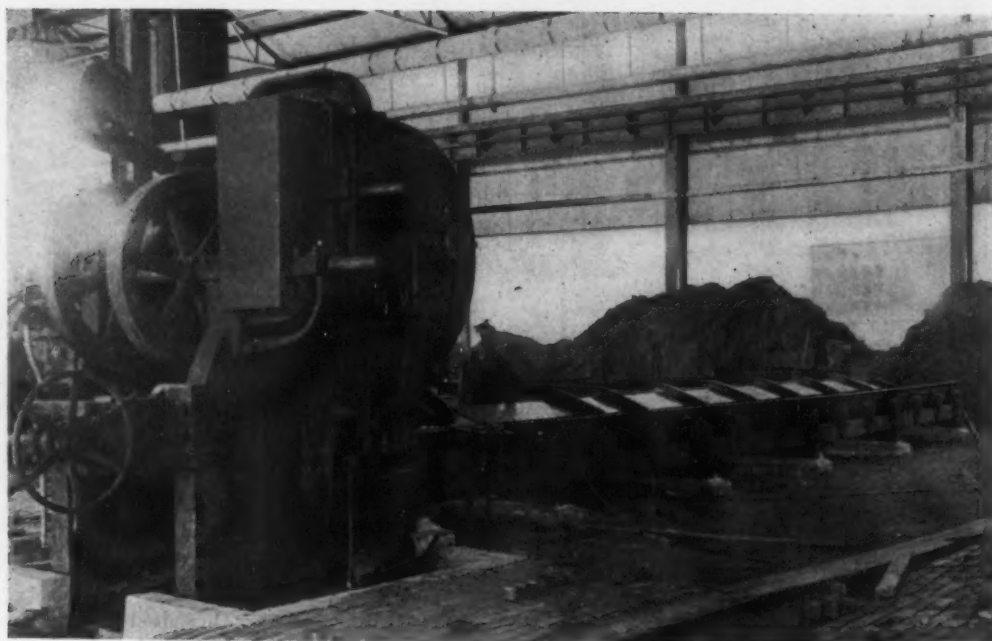
growing list, and is a subsidiary of the Metal & Thermit Corporation, 120 Broadway, New York.

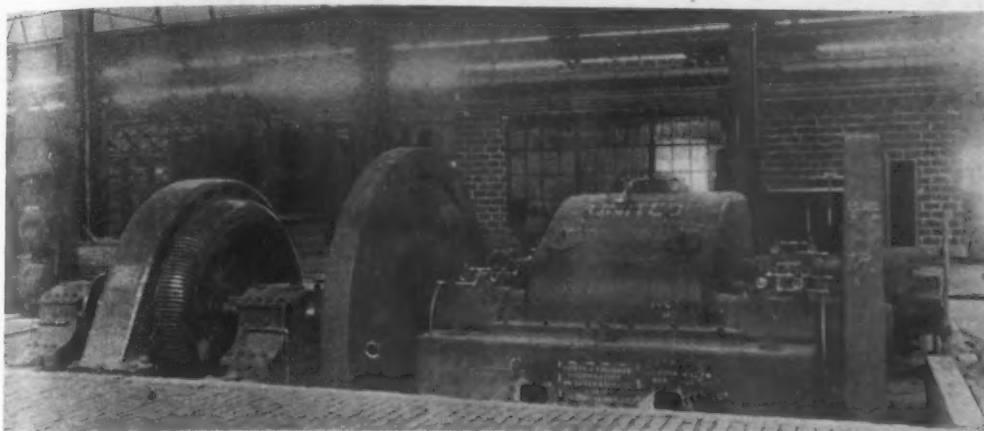
Products to be manufactured at the beginning include blue annealed, black and galvanized sheets in such gages and sizes as the local market may demand. The plant is located on a tract of land adjoining the detinning plant of the Metal & Thermit Corporation, which has been established at that point for several years. An arrangement has been made with the Pacific Coast Steel Co., located less than a mile away, to furnish sheet bars to the new mill from its ample open-hearth capacity. Prior to the consummation of this arrangement, elaborate plans had been made by the new com-



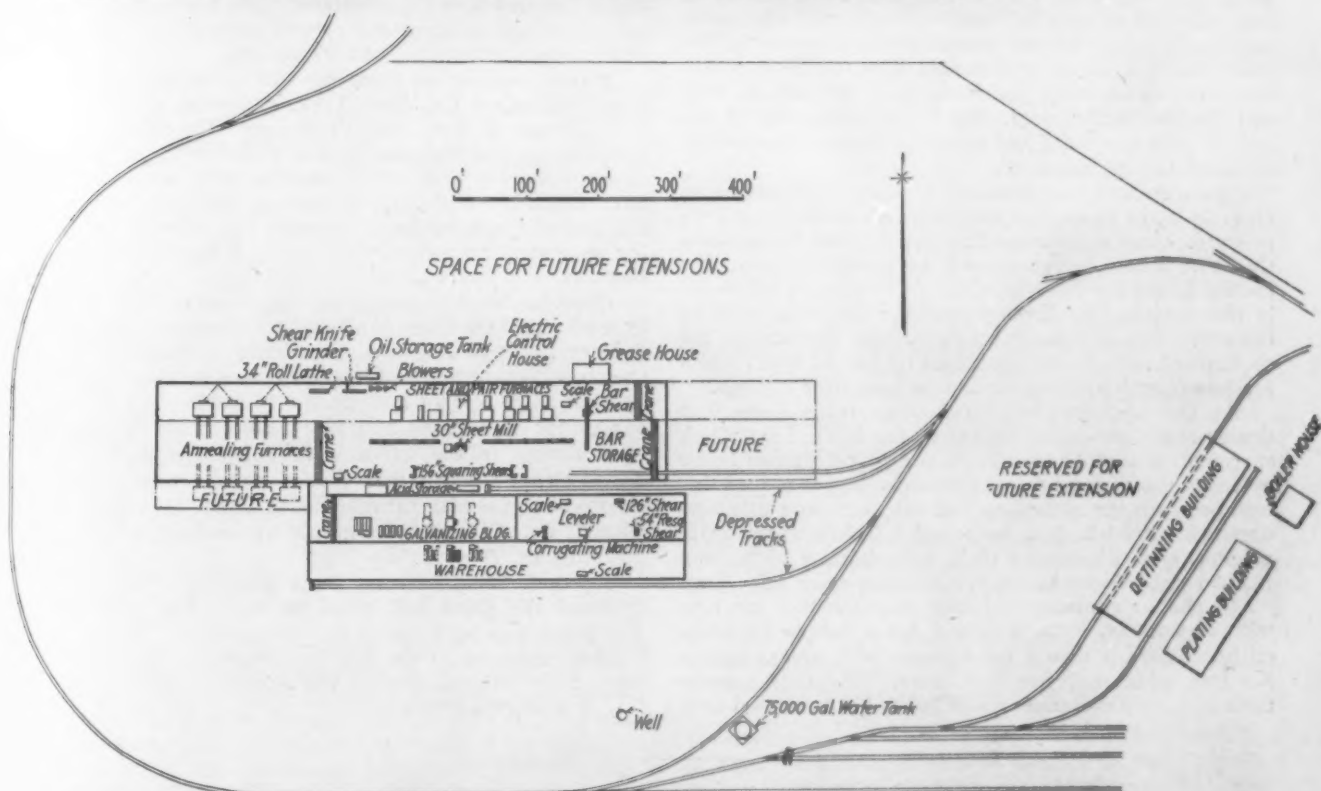
General View of the Sheet Mill Building During Construction. Resquaring shears (156-in.) appear at left, with the mills and motor drive in center and furnaces in the bay beyond the columns. In right foreground is approach end of the bar shear table

Bar Shear and Table at One End of the Train of Sheet Mills, Showing Skids of Approach Table





Main Drive of the Sheet Mill Train, Consisting of a 1500-Hp. Motor Operating Through Gearing. The control house is shown by the windows above the gear box. A 56-in. sheet and pair furnace appears back of the motor



(Above) General Plan of the Plant, Showing Provision for Future Extensions

Four Double-Track Annealing Furnaces Are Located in the Lean-to, to the West of the Battery of Sheet and Pair Furnaces



pany for its own open-hearth and blooming mill departments, now abandoned.

In addition to its strategic location in regard to the supply of bars, for which the plant is served by a local belt railroad, it is anticipated that in all probability it will be eventually on a deep water channel of San Fran-

cisco Bay, which will add greatly to its facilities for exporting its products. This development is under consideration. The all-year evenness in climatic conditions makes it an attractive location for a mill of this type, permitting maximum production, which will not be affected by extreme hot weather during the summer.

Consisting of six mills, with the usual auxiliary departments found in such establishments, the plant includes storage for long sheet bars, with the bar shears for cutting up long lengths into rolling sizes, and rolling mills, including cold rolls, annealing departments, galvanized departments and warehouse. Construction was commenced in July, 1923, and the plant was put into operation eight months later. This record was reached in spite of the fact that practically everything which went into the construction and equipment of the plant had to be shipped from the East.

Equipment Installed

In the 30-in. (rating) sheet mill the four sets of rolls to the west of the motor include a 56-in. (long) breaking down set and 56-in. finishing set, together with a 38-in. finishing set and a 44-in. set of cold rolls, the latter being located at the outer end of the train. To the east of the motor are seven sets of rolls, including one 44-in. and one 38-in. sets of roughing rolls, one 44-in. and three 38-in. sets of finishing rolls, and one 44-in. set of cold rolls, likewise located at the outer end of the train. Each group of rolls is served by two 60-in. steam doublers conveniently placed between the line of rolls and the line of furnaces. On the opposite side of the line of rolls are the usual squaring shears, there being three of 160 in. capacity.

The sheet and pair furnaces, six in number and rated from 38 in. to 56 in., are fired with crude oil, using low-pressure burners furnished by the Surface Combustion Co. The mill is driven entirely by electric power. The control house for the mill, about 32 ft. square, is located in the furnace bay directly opposite the main drive of the mill. The bar shear, located at the east end of the east run of rolls, is provided with feed and runout tables for handling the bars both before and after cutting.

At the west end of the furnace lean-to are four double-track annealing furnaces, the brick floor which surrounds the mills and sheet and pair furnaces being extended past the annealing furnaces. At the rear of this bay, between the annealing and the sheet and pair furnaces, are a 34-in. roll lathe and a 170-in. shear knife grinder. An oil storage tank, 8 ft. diam. x 30 ft. long (11,000 gal.), lies outside the building near this point.

In the galvanizing building is a pickling machine with two tanks, with provision for a future duplicate outfit. There is also a pot furnace with arrangements for two additional furnaces later. The acid storage tank is 8 ft. in diameter and 30 ft. long, located con-

veniently at the end of a spur of depressed track, from which it may be filled. This track, which comes in between the mill building and the warehouse, may serve both.

In the warehouse section of the building the equipment includes a corrugating machine, two 10-ton scales, a leveller and two resquaring shears, one being 54 in. and the other 126 in. rating.

Buildings and Cranes

The main building, 675 ft. long and 130 ft. wide, including the 50 ft. lean-to housing the furnaces, is entirely of steel covered with Johns-Manville patent roofing. This adjoins the galvanizing and warehouse building, which is 500 ft. long and 110 ft. wide in two bays of 60 ft. and 50 ft. This building is of steel construction with hollow tile walls. The alley between the two buildings, 18 ft. wide, contains the depressed track already mentioned. The buildings were erected by the Union Construction Co., Oakland, Cal., while the foundations, piling, grading and sewers were put in by the Coast Construction Co., San Francisco.

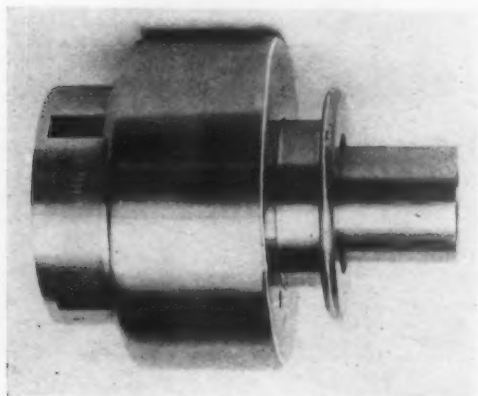
All furnaces in the plant are the design of the Surface Combustion Co., New York, and were erected by J. T. Thorpe & Son, San Francisco. The mills were furnished by the National Roll & Foundry Co., and the double reduction gear drive, together with shears, roll lathe and other auxiliary equipment, were provided by the United Engineering & Foundry Co. The galvanizing equipment was furnished by the Aetna Foundry & Machine Co., Warren, Ohio.

Sheet mills and annealing department are served by a 40-ton Shaw crane furnished by Manning, Maxwell & Moore. There is also on this crane runway a 10-ton structural type crane and in the furnace lean-to, for the purpose of delivering bars to the furnaces, is a 15-ton box girder type crane and also a 15-ton crane of the same design in the galvanizing department, all furnished by the Cyclops Iron Works, San Francisco. The electrical equipment throughout is from the General Electric Co. This includes a 1500-hp. motor for driving the mills at 30 r.p.m.

Frank I. Ellis, Farmers Bank Building, Pittsburgh, designed the plant and acted as consulting engineer. The plant was built under the direction of Charles R. Hughes, manager of the new corporation, who was for many years connected with the American Rolling Mill Co., Middletown, Ohio.

New Die Head for Acme and Other Automatics

A new type H & G die head designated as style AA and intended for use on the Acme automatics and other machines in which the die spindle rotates, and the stock



does not, when threading, has been placed on the market by the Eastern Machine Screw Corporation, New Haven. Accurate adjustment for the length of thread cut, the adjustment being positive in its action is a feature.

The die head is closed by a compression action brought about by the backward movement of the die

spindle. It is provided with an outer shell having a spool at the back to take a yoke. When the forward motion of the yoke is stopped, the die head immediately trips. When the threading spindle is drawn back and the backward motion of the yoke is arrested by means of a stop, the die head is closed automatically.

The new development is claimed to simplify the installation of the die head on machines where the die spindle rotates and the stock does not, and where very accurate adjustments for length of thread are essential. It is said also to eliminate trouble from short ends.

British Housing Plans

Plans of the Labor Government of Great Britain, intended to provide homes and at the same time help solve the unemployment problem, include the erection of 90,000 houses in 1925, with the number increasing year after year to a maximum of 225,000 houses per year during the period from 1934 to 1939. It is planned to distribute the cost of this work over a period of 40 years, although the construction will be completed in 15 years. The total cost is estimated at £1,376,000,000, (\$5,972,000,000 at \$4.34 per £.)

The Carnegie Steel Co. has commenced the work of rebuilding and enlarging No. 1 blast furnace in its Ohio works group at Youngstown. Plans for development include modernization of this stack along the most advanced lines, involving expenditure of a large sum.

Iron and Steel Imports Largest Since July

May Receipts Nearly Up to 1922 and 1923 Averages—

Rails, Pipe and Ferromanganese

Heavy

WASHINGTON, May 26.—Imports of iron and steel in April of this year, totaling 50,969 tons, compared with 39,278 tons in March, were valued at \$2,617,966, and were the largest since July, 1923, when they amounted

Of the pig iron imports, 4851 tons came from Canada; 4204 tons from France; 3800 tons from British India; 1700 tons from England; 1286 tons from Scotland; 704 tons from Germany; 500 tons from the Netherlands; 100 tons from Belgium, and 26 tons from Sweden. Of the rail imports, 3427 tons came from Bel-

Imports of Iron and Steel Into the United States

(In Gross Tons)

	April		Ten Months Ended April	
	1923	1924	1923	1924
Pig iron	36,371	17,171	585,489	133,797
Ferromanganese	6,053	6,066	93,393	54,563
Ferrosilicon	1,168	1,305	15,098	10,845
Scrap	22,755	6,900	192,395	71,456
Steel ingots, blooms, billets, slabs and steel bars	1,262	3,527	24,076	27,682
Rails and splice bars	2,917	4,620	17,602	25,608
Structural shapes	1,290	2,002	9,239	13,650
Boiler and other plates	5	5	1,503	2,893
Sheets and saw plates	105	250	844	2,749
Bar iron	1,237	479	8,800	4,808
Tubular products	528	6,375	2,559	15,563
Castings and forgings	302	204	1,071	2,304
Nails and screws	118	12	599	431
Tinplate	3,268	546	9,310	1,302
Bolts, nuts, rivets and washers	17	4	121	134
Wire rods	29	882	2,451	4,962
Round iron and steel wire	315	196	2,101	2,742
Flat wire and strip steel	149	329	641	1,716
Wire rope and insulated wire, all kinds	14	96	376	808
Total	77,903	50,969	967,668	378,013
Manganese ore	14,071	29,729	258,557	228,967
Iron ore	171,459	149,815	1,614,779	2,050,735
Magnesite	5,879	8,204	93,669	43,807

to 53,464 tons. The heavier imports were reflected principally in incoming shipments of two finished lines, including rails and tubular products, the former amounting to 4620 tons and the latter to 6375 tons, and in ferromanganese, imports of which were 6066 tons. Imports of pig iron, amounting to 17,171 tons, also showed a slight increase.

Imports of Iron and Steel in Gross Tons

(Monthly Averages)

	Total Imports	Pig Iron	Ferro-alloys	Manganese Ore and Oxide*
1909 to 1913, incl.	26,505	14,132	3,281	147,155
1914 to 1918, incl.	23,351	4,645	3,710	37,115
1919 to 1921, incl.	23,901	5,708	9,117	31,204
1922	59,545	31,954	5,120	829
January, 1923	120,078	83,935	9,234	4,636
February	67,704	35,793	9,030	12,799
March	106,197	72,344	7,221	14,071
April	77,903	36,371	10,482	12,734
May	75,883	39,764	12,794	36,138
June	68,019	30,033	8,980	13,535
Six months' average	85,964	49,706	12,381	23,824
July	53,464	19,760	7,334	23,026
August	45,439	14,564	9,744	35,175
September	36,611	8,353	9,372	16,842
October	29,882	9,349	5,072	14,790
November	26,364	9,299	2,307	12,003
December	27,009	12,355	8,343	17,171
Twelve months' average	61,217	30,652	3,033	23,081
January, 1924	26,675	10,587	4,847	4,430
February	42,269	15,482	3,941	46,067
March	39,278	16,919	7,371	29,729
April	50,969	17,171	6,541	21,668
Ten months' average	37,802	13,380		

*Not included in "total imports."

†Included ferroalloys.

‡Average for three years, 1916 to 1918 only.

Sources of American Imports of Iron Ore

(In Gross Tons)

	April		Ten Months Ended	
	1923	1924	April, 1923	April, 1924
Spain			72,182	104,736
Sweden	63,669	15,103	432,537	481,568
Canada	224	311	2,265	12,028
Cuba	38,800	30,404	516,588	486,746
French Africa	32,814	10,758	162,985	258,626
Other countries	45,952	93,239	428,222	757,031
Totals	171,459	149,815	1,614,779	2,050,735

gium; 799 tons from Canada; 213 tons from the Netherlands; 103 tons from France and 83 tons from Germany. Of the tubular products, the chief importation, amounting to 3893 tons, came from Belgium; 1989 tons came from France; 183 tons came from England and 53 tons came from Germany.

Imports for the 10 months ended with April totaled 378,013 tons, valued at \$20,915,665, against 967,668 tons for the 10 months ended with April of last year.

Iron ore imports in April amounted to 149,815 tons, while manganese ore imports were 29,729 tons.

Tests of Metal Structures

Researches on the strength of metal structures now in progress at the Bureau of Standards were reported to the Advisory Committee on Structures and Fabricated Metals, which met at the Bureau of Standards, Washington, May 20. Represented on this committee are the War and Navy Departments, the engineering societies, iron and steel manufacturers and other commercial organizations, engineering professors and consulting engineers.

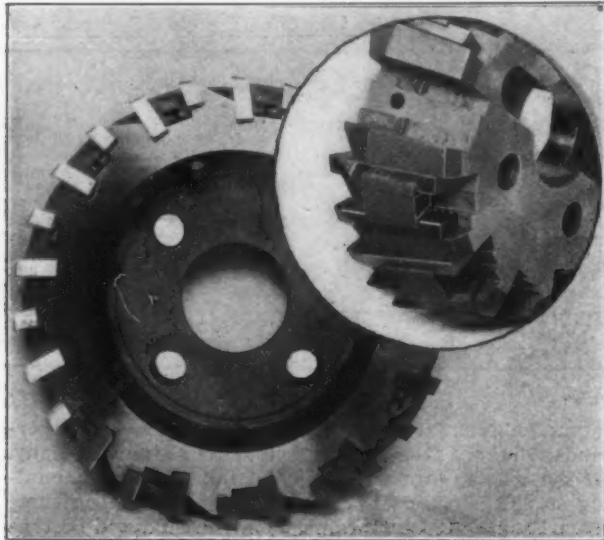
Reports were submitted dealing with strain gage tests on a 350-ton crane, calibration of testing machines, strength of steel columns, fatigue of woods and metals, specifications for wire rope, testing of the Brinell hardness of metals, strength of brick walls, tests on the tower sections and cables of the Delaware River bridge, notched bar bending and impact tests, allowable load on zinc roofing, strength of girder hooks, tests of welded rail joints, tests of riveted joints, specifications for burglar proof safes and tests of airship members.

Residents of Portsmouth, Ohio, have completed plans for incorporating a company to erect a bridge across the Ohio River at that point. The undertaking will be financed through the Chamber of Commerce, similar to the project completed at Ironton, Ohio. E. E. Fullerton, Greenup, Ky., who handled the financing and erection of the Ironton bridge, will act in a similar capacity, and will undertake to incorporate a company to raise the money necessary for the project, which will cost in the neighborhood of \$1,000,000.

Inserted-Tooth Face Milling Cutter with Hardened Body and Rigid Blade Clamping

Inserted-tooth face milling cutters in which all parts of the cutter-head or body are hardened and ground, the method of clamping the blade being also a feature, have been placed on the market by the Modern Tool Works of the Consolidated Machine Tool Corporation of America, Wilmington, Del.

The cutter head is designed for either Stellite metal or high-speed blades and hardening of the cutter head is intended to permit of maintaining accuracy in use. The method of clamping the blades in place is said to provide the rigidity of a solid cutter. The method employed is intended to eliminate the necessity for the accurate machining of the slots and blades and the ex-



All Parts of the Cutter Head Or Body Are Hardened and Ground. A two-piece clamp drawn into place by a taper wedge bolt is used to hold the blade in place

pense incident to obtaining a proper drive or press fit between the faces of the cutters and slots.

The blades slope away from the largest diameter on a 20 deg. angle. This provides clearance for the grinding wheel to pass over the clamps when sharpening and also provides clearance for the interlocking of two cutters when necessary to finish a surface too wide to be machined by one cutter. The blades are placed in the cutter body at an angle of 6 deg. toward the cut or line of travel. The slots are milled parallel with the bore when equipped with Stellite blades. When high-speed blades are used the slots are milled at an angle intended to assure the proper rake for blades of that material.

The method of holding the blades may be noted from the accompanying illustration, a two-piece clamp drawn into place by a taper wedge bolt being used to hold the blade in place. Each slot of the cutter takes two blades between which the taper wedge is fitted with the clamps bearing on top of the blades as shown. When the bolts are drawn tight the blades are locked solidly. A socket wrench is the only tool required. To remove the blade the nut on the wedge bolt is loosened, and the bolt tapped slightly. A hammer or press is not required to locate the blades in place, reset or adjust them.

The blades are provided with notches on the under side, which fit over a stop-pin. This not only backs up the blade but in adjusting the blades for grinding, each blade may be advanced one notch and all the blades brought out exactly the same distance. This feature is emphasized as eliminating damage of the face of the slots by driving the blades in or out, eliminating also chipped, cracked or broken blades due to blows from a hammer.

The cutters are made in two pitches, the type A being known as a coarse pitch and type B as a fine pitch. Sizes from 4 to 16 in. are regularly available, larger sizes being made special.

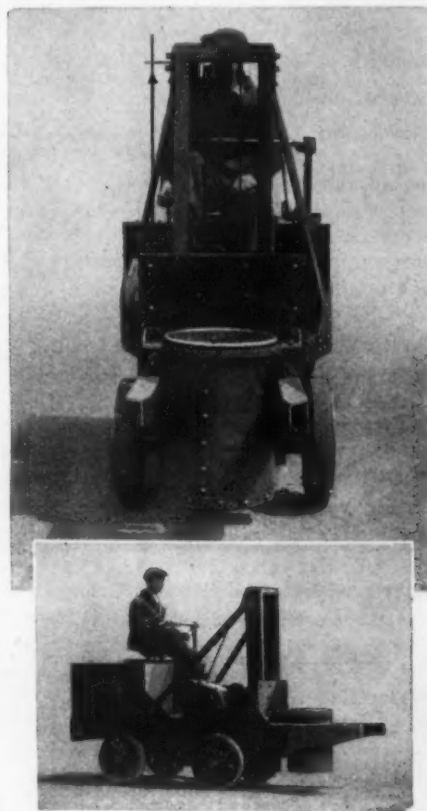
Elevating Truck and Tractor Arranged for Low Pickup

A storage-battery industrial elevating truck and tractor arranged as shown in the accompanying illustration has been added to the line of the Elwell-Parker Electric Co., Cleveland. In this design the load may be picked from or placed on the floor, the load carrying platform requiring little clearance above the floor.

The elevator head at the forward end may be equipped with two or more forks at the floor line, 1 to 2 in. thick and of proper spacing and length to handle sheet tin or steel plate, bales, boxes or barrels, car wheels, receptacles in heat treating, a tilting table, dump body or the like. When fitted with a pair of arms 18 in. above the floor, tote barrels may be handled and when equipped with a single horizontal shaft the machine may be used in handling coils or wheels.

The machine is made up of the company's standard tractor type, hot riveted "tractor" frame with battery compartment and hinged cover. The operator's seat is located forward to provide unobstructed vision of elevator movement, and the seat is arranged to actuate the electric circuit breaker connecting the battery to the controller located in the compartment. The circuit breaker closes only when controller drum is in off position and the controller comes to full stop when reversing. A brake pedal with heel operated latch is located on foot board, actuating dual contracting shoes on 7 in. brake drum.

The drive axle is located at the elevator or front end to assure traction under all conditions of loading.



Elevating Truck and Tractor Equipped With Tote Barrel Attachment

The wheel base is short, and all four wheels equipped with 7 in. double row ball bearings and 20 in. x 3 1/2 in. tires. The hoist unit, which is mounted immediately in front of operator, consists of an inclosed motor and electric brake. The motor drives through bevel and worm gear reduction inclosed in oil-filled housing to the single-grooved drum grooved for 3/8 in. plow steel cable. The cable leads over sheave at top of elevator uprights to the traveling elevator head, which is provided with special attachments to support the load handled. The elevator head is guided by four rollers running inside the upright channels. The hoist motor is operated through a controller at right of driver's seat.

Service as Applied to the Sheet Industry

What Should Be Considered by Maker and Consumer to Improve Conditions Affecting Quality, Price, Delivery and General Satisfaction

BY "MILLMAN"

LOOKING from the outside in, the author, until recently identified with one of our well-known makers of sheets, attempts in this article to point out what needs to be done to develop a better understanding of the problems of both parties to a purchase of sheets. In the issue of March 20 he argued for simplification in gages, styles of finish and sizes and in the issue of Feb. 14 he discussed mill reasons for variations from the strict letter of specifications.

THOSE among us who have a fair knowledge of the steel industry know that rolled sheets form a very large and important part of it. Sheets are required to be produced in many sizes, grades and surface finishes. Nearly every individual depends upon them in some form or other for comfort, pleasure or convenience. From mine to mill, from cannery to kitchen, from roof to cellar and from flivver to fleet, they are in evidence; they are rendering service; they are essential.

Difficult to Make and Consuming of Time

These things may be truly said in their honor and in justice also we may admit that nothing important is easy to achieve. Some sheets are among the most difficult of all steel products to make, and require the longest time.

The hot rolling and finishing methods employed in the industry are among the most hazardous because so many things can happen to the product during its many transformations. The methods are rather crude, the machinery cumbersome, and there are few fool-proof controls, the human eye and brain largely governing. Something absolutely unforeseen and unpreventable may at any point spoil the material for its purpose and make it necessary to start all over again at the open-hearth furnace.

We know that in the organization of any industry there are men possessing expert knowledge of all of its products. These men know how they are made and why so. They also know the purposes for which they are best suited. They make it their business to keep posted on their products, otherwise they cannot render a quality of service equal to or better than their competitors.

Many men do not know, perhaps they have not the time or do not realize the necessity of knowing, very much about the products they buy as their raw material. They must have satisfactory material when they need it. They emphasize this fact. If they knew the problems confronting the manufacturers and how purchases affect these problems they might be able to assist in some way in securing better service for themselves—perhaps by ordering further ahead, by switching from one finish to another, by rearranging shipping dates or by bringing their customer into the problem and getting his cooperation. On the other hand, the party receiving an order should consider himself as greatly favored as the party placing the order. In fact, the receiver is usually more favored, because over-production more often prevails than does under-production.

In the sheet industry there is very little room for argument except technically as to the causes of poor

quality. They are seldom due to wilfulness on the part of the manufacturer, but are more often the result of an error in specifications, carelessness in treatment or inspection, or poor quality of raw material. The only recourse is for the purchaser to reject and the mill to replace, both of which should be done without unnecessary delay.

Material should be examined upon receipt to establish its quality, and if found to be other than ordered, the fact should be reported at once. The mill should not delay an investigation unless mutually agreed, as it is in a more dangerous position than the purchaser. It has presumably produced a faulty product; some permanent misstep may have been made unconsciously in the processing methods and requires immediate correction. Its reputation is at stake and, worse than this, the quality actually may be poor. The purchaser, by laying the sheets aside, does not jeopardize the quality of his product. He may sustain a financial loss through loss of business and reduced output, but his quality need not suffer.

Every manufacturer no doubt can recall instances where several successive carloads were made wrong, perhaps avoidably so and perhaps not, but which would not have been done had the quality of the first car been detected promptly and reported. Such faults are expensive to both parties and also exasperating, but if both parties would get together and decide on a plan which would prevent a recurrence a real and important mutual service would be rendered.

Kind of Information Mill Desires

Although it is well for each purchaser to learn as much about the products he wishes to buy as possible, it is more important that he be very clear in his specifications, leaving no room for doubt as to what he wants. If he does not know the quality he requires, let him explain the purpose of it, how it is to be fabricated, the surface required of the finished article and, best of all, if possible present a finished specimen to the mill for inspection. If the mill agrees to furnish, then it is absolutely responsible. This is the safest method to pursue when placing an order with a mill for the first time. When placing repeat orders, a safe procedure is to describe the material precisely as described on the mill's invoice, and in addition instruct that it be the same as that covered by the other invoice.

The desire for a better quality of sheets is undoubtedly growing and not without good reason. With a better sheet a user can make a better product, a larger volume and at a lower factory cost. He can oftentimes thereby establish a lower selling price and supply a larger number of consumers. The popularity

of an article increases in proportion to its merit and price, and it behooves those responsible for its production and distribution to keep up the quality and keep down the price.

No matter how high may be the quality or how great the demand, an article cannot be made profitable and prove a genuine service unless it can be secured when and as wanted. How often have we heard a distributor of an article say, "Yes, it is good, but I cannot get it when I want it and for this reason I do not handle it." This may not be the fault of those making the article but rather of those furnishing the raw materials.

Large consumers of sheets usually have two or more sources of supply because they cannot afford to place their entire dependence on one source only. Something might happen, probably would, to delay production and shipment of a part of their purchase.

Sticking to Sources of Supply

Delays are a great source of complaint and are really more serious than poor quality. They more frequently happen when business is good, and at such a time result in the greater loss to the purchaser. If he has not the raw material he cannot manufacture and therefore cannot fill his orders. His competitor gets the business. When business is poor, sheets are easy to buy and hard to sell. No one wants very many. The manufacturer who uses sheets and adopts a policy of buying from just any mill will, in time, learn that sheets cannot always be had in this manner. He may also find that the quality is not what he requires. It is just as necessary for the mill supplying him to be as familiar with his requirements, with the grade and finish of the sheets he needs, as it is that he be acquainted with his customers' needs. Therefore the consumer should carefully select regular sources of supply and buy from them only.

The ultimate consumption of sheets does not vary from year to year as much, perhaps, as does production. Many articles last for a long time but the wasting away is uniform to a large extent. There is a yearly depreciation, or actual loss of metal, which is cumulative.

Sheets which are needed this year cannot be made next year, nor would any conservative mill make large quantities in anticipation of business later on. Consumers of sheets as a rule are also conservative. They seldom are encouraged to estimate their needs very far ahead.

Manufacturers would no doubt prefer to maintain a uniform quantity of production, as this would enable them to regulate better their purchases, their labor supply, their quality and delivery. It would also result in more uniform costs and selling prices.

Importance of Advance Ordering

When a purchaser places an order for sheets for shipment on a specified date the material presumably has been given a definite place in his manufacturing program, and will be needed as specified. He should not be encouraged to, and probably does not, order much more than he needs. It would be well for him in his calculations to allow for some delay and to request shipment a little earlier than actually required. Many things may happen in the mill to retard shipment. Some mills buy their sheet bars and there may be a delay in getting the required quality or quantity. Some grades and finishes are so difficult to make that it is necessary to re-process large percentages time after time. There is a terrific strain on sheet making equipment and serious breakdowns oftentimes occur. Material is frequently delayed in transit and for this the railroads are to blame. None of these delays can be foreseen or avoided.

For several years sheet contracts have usually been made for a definite tonnage to be shipped within a specified period and at a stipulated price. It is of equal advantage to both parties to name also the quantity that shall be shipped during each month of the period so that the purchaser may have some assurance of receiving material when he wants it. Rolling mill schedules must be planned in advance and should be closed a week or two before manufacture starts in order to assure having bars on hand when needed and to realize a uniform quantity production and desired dates of completion. Different sizes of sheets must follow each other through the rolls in proper sequence. Some sizes can be rolled only in the early part of the week and some not until the latter part of the week. After they are rolled it frequently requires several weeks to get them ready for shipment.

Orders should be placed with the mill as far in advance of the shipping day as possible, and if they cannot be placed for the full amount of the contract as agreed, some arrangement should be made promptly to extend the contract or cancel from it. When a mill knows it can depend upon its customers to cooperate in this respect, it can arrange its schedules in advance much better to give the best possible service.

At times shipments of orders may be so frequently and badly delayed as to give the impression that the mill is wilfully holding them back, either because they are difficult to make or to accept more profitable business. It is also sometimes thought that purchasers hold up shipments at times because the market has changed and they can make new purchases at lower prices than stipulated in their contract. In either case the practice is unfair and unwarranted. Material when bought should be supplied and accepted.

Bane of Overordering

Productive capacity probably exceeds normal consumption. If the demand did not fluctuate, production would be more uniform and prices would be more stable. The necessity for competitive bidding would be largely eliminated, wages would be more uniform and jobs would be more permanent. The tendency to overestimate consumption and to prepare for it by increasing buying and production is harmful to the industry. The demand for raw materials should be brought about by actual consumption of the finished product.

Conditions in the sheet industry have improved greatly in the last few years largely on account of a cooperation between manufacturers and consumers and a more conservative policy on the part of each. The necessity arising for a better product in increasing quantities to supply the automobile, electric, furniture, enamelling and other industries has resulted in a better understanding of the limitations of the one and the requirements of the other.

Consumers of sheets can get satisfactory service in proportion to the understanding and cooperation that exists between themselves and the mills. Benefits will accrue to each when a spirit of trust and mutual helpfulness prevails.

Imports of crude materials for use in manufacturing in the United States were 30 per cent less in value in March this year than in March, 1923. Imports of manufactures for further use in manufacturing showed a decrease of 23 per cent, comparing March this year with March a year ago. Imports of manufactures ready for consumption showed a decrease of 15 per cent, one month compared with the other. As to exports, there was an increase of 7 per cent in crude materials, of 9 per cent in partly manufactured goods and a slight reduction in the amount of completely manufactured goods, comparing March, 1924, with March, 1923.

Industry Doing Its Part in Community

Promotion of Civic Consciousness by Manufacturers as
Illustrated by Success in One City—Real
Dividends Paid

BY BENNETT CHAPPLE*

THE dollar side of civic consciousness on the part of industry is just as real as the dividends that come from efficient production. Alert business men have found that a working partnership and a real spirit of cooperation between the community and industry affects industrial and community stability, which has a direct bearing on profits. It is no longer looked upon as altruism, but as good business for industry to invest in community conditions that respond to the highest needs of stable, sober, industrious, thrifty and ambitious men.

There is no guess work about this policy, so far as the industries of Middletown, Ohio, are concerned. More than 20 years ago a number of manufacturers in that city began to put part of their earnings each year outside the walls of their plants in an effort to bring about better civic, moral, physical, social and educational conditions that would be helpful to the community of which they are a part. This decision was born of the definite belief that such things are of vital interest to the success, progress and prosperity of the industry itself. These industries look upon the work as an essential part of overhead and as a matter of regular expense, quite as much as insurance, and just as important, for a labor disturbance can be as devastating as a cyclone.

After all, what excuse has industry to look selfishly upon its support of Y. M. C. A. work, Home Nursing Service, and other helpful civic agencies, as a mere donation? It isn't fair. It is not a matter of parsimony, not a matter of welfare, but a business problem—pay out a dollar and get a profit in return.

Industry Is Dominant

Then there is another side to the question. The dominant thing in the world today is industry. Even as the genius of the past generations found expression in the field of art and literature, so the genius of the present age is in the field of business. This imposes a responsibility on business and industry which sobers the minds of thinkers, for it is a responsibility that can be measured only in terms of service to humanity. Inspired business men must take the place of inspired artists. The world is looking to them for leadership. Business has been called selfish, cold hearted, but in the light of a new understanding it is growing warm and unselfish.

In the panorama of the world's history, religion has played its part as the great moving drama of human brotherhood. Education, too, found its supreme service in the establishment of the public school system that all might enjoy the same advantages. Out of such movements have come the great epochs of human experience and as each new force found ascendancy, it took onto itself the responsibility of leadership in world thought and world idealism. Each has been a stepping stone of progress, each, following one after the other, giving a broader view and a broader understanding.

Great Industrial Age

Then came the great industrial age. Like a flood, it has inundated the old foundation. Preachers, educators and others engaged in the cultural phases of life, all were swept off by the undertow of business. Probably nothing has so startled the world as the realization that the great educational forces were the most poorly paid, and this in itself has done much to rekindle the

smouldering flame of discontent of men and institutions of today. Reduced in affluence and left to exist on meager salaries, the great constructive forces of civilization were swept from their moorings. It was apparent that the world had entered into a new phase of its existence; that the need of increased production had forced industry to become the dominant thing in life. With this very dominance has come the same old responsibilities—yet a new one to industry—that of leadership in things not formerly concerned with business. Industry today must reach beyond its factory walls and preach the gospel of happiness and stability as well as the gospel of dollars. If industry meets this challenge to a new order of things, all is well. If it does not, then industry is like a house built upon the sand. In its greed and selfishness it will fail, and some other unseen, dominant thing will take its place. The laws of the universe are immutable; the laws of human relations are just as positive. If industry takes substance from the world and does not put back in kind, it is like the unwise farmer who robs the soil of its fertility.

Matching Dollar for Dollar

Middletown industries have found after an experience of more than 20 years that it is a profitable investment to match dollar for dollar every cent invested by their employees through their individual contributions to civic betterment. Industry takes the position that it is justified in doing this on the grounds of benefits to be derived. Employing upward of 8000 men today, the American Rolling Mill Co., for instance, has never lost an hour because of strikes or labor trouble. Contrast this with the millions lost elsewhere through conflict and dispute. The reason is obvious. There can be no room for disagreement between company and men when they stand together on the broad platform of mutual interest, not only in those things that have to do with company operations and organization problems, but those things that have to do with their community as well.

A separate story could be written of the special benefits to community and industry alike from each of the well-known agencies that make for public helpfulness. Take a specific case somewhat removed from the more dramatic appeal of the hospital and relief work. Has it paid business institutions, for instance, to invest money in the Boy Scouts? Let us see. When the manufacturers and employees join the citizens at large in employing an efficient scout master, the whole plan of boy scouting is put on a successful basis in that city. Through this means practically all of the boys in the city of scout age are brought together under competent troop leaders. Out of it comes a wonderful training for the boy during the most impressionable years of his life.

Training Boys for Industry

After four or five years of such training, first as a boy scout and then possibly as a boy scout leader, the young man enters industry and becomes a strong, clean-living type of workman that inspires the confidence of those about him. Hundreds of these boy scouts have stepped from the ranks of scouting into the ranks of industry of Middletown, trained, efficient, clear-eyed boys who are the hope of the future.

The same thing might be said of girl scouts. Although they may not generally enter industry, they eventually marry the young men who do enter indus-

*American Rolling Mill Co., Middletown, Ohio.

try and in this way become a very influential factor in the industrial life of the community.

Middletown has accepted the challenge of the new dominant force in human relations, its industries have joined hands and resources in civic development, because it is a good investment. In all, there are 17 separate and distinct civic agencies, each doing a wonderful work of community helpfulness and all operated under the Middletown Civic Association. These agencies include those things usually covered by a community chest, except that under the Middletown plan all of the

agencies are grouped under one head and under one management. Bankers, business men and workmen alike make up the 4475 members of this Civic Association, each one investing \$12 a year or more in the form of multiple memberships. Shoulder to shoulder the industries of Middletown, working on the approved "fifty-fifty" basis, collectively subscribed for as many memberships as did the individual citizens. The result is a large and sufficient maintenance fund to keep all of the civic agencies on a well-equipped and efficient basis.

TRADE ASSOCIATION WORK

Test Case Will Be Brought with Cooperation of Attorney General Stone

WASHINGTON, June 3.—Further conferences were held last week between Attorney General Stone and representatives of trade associations and other business interests with regard to the setting up of a code for legitimate trade association work. The Attorney General is represented as being anxious to bring this about at as early a date as possible and his attitude is understood to be entirely sympathetic toward legitimate trade association work. It is evident that the Department of Justice and the Department of Commerce are cooperating in settling the problem. Secretary of Commerce Hoover, like the Attorney General, is desirous of bringing about a solution at an early date.

Conferences which the Attorney General has had with representatives of trade associations and others interested in the question are understood to have proven beneficial and to have brought about progress. While soon after Mr. Stone took office it had been planned to have the Government bring friendly suit against some trade association against which no proceedings had been previously instituted, a different line of action now has been proposed. The Attorney General, after giving thought to the original suggestion, has concluded that it would not be as satisfactory as it would be to let the test case be applied to some pending case. Therefore, it is now contemplated to take a trade association against which charges have been filed but still is in the lower courts and has not been taken up for prosecution. The plan is to arrive at an agreed statement of facts in such a case and to take it through the courts on this basis. Should the association come through the courts with clean hands, it would then be considered that the work of such an association could be set up as a legal chart by which trade association activities could be conducted, without danger of prosecution. This would have the force of stability rather than a mere informal code agreed upon by Government officials now in office. Trade associations do not want a code that might be of a passing nature and therefore be surrounded with uncertainty.

The Department of Justice, while represented as being sympathetic toward trade association work, naturally will demand that any code set up shall be absolutely legitimate in every respect and shall be comprehensive, so that it will embrace all of the important activities of trade associations and not be confined to only two or three other fundamental purposes.

The problem is recognized by Department of Justice officials as well as those of the Department of Commerce to be a difficult one and there still are obstacles to overcome. But indications are that fair progress has been made and it is felt that the desired code may be developed within a reasonable period, although no specific time can possibly be stated by Government officials.

Civil service examinations are announced for the position of cartographic draftsmen, Navy Department, at an entrance salary of \$1,860 per year. Information and application blanks may be obtained from the Civil Service Commission, Washington, or from the post office or the custom house in any city.

NEW PLANT CONSTRUCTION

Youngstown Sheet & Tube and Other Companies Give Work to Many Men

YOUNGSTOWN, June 2.—Two new butt-weld tube mills under construction by the Youngstown Sheet & Tube Co. at its Indiana Harbor works will be completed and ready for production during June.

Work is progressing on the new butt-weld pipe unit being added to the Republic Iron & Steel Co. to its tube mill complement at Youngstown. This new unit will give the Republic company a total of seven tube mills in this group, including four butt-weld and three lap-weld mills.

The Trumbull-Cliffs Furnace Co. expects to have ready for operation by midsummer its 47-unit by-product coke oven plant at Warren, which will supply coke to the company's blast furnace. This stack is now inactive for extensive overhauling and repairs.

The Sheet & Tube company is taking advantage of the lull in operations to make extensive repairs to its East Youngstown plants, and men who might otherwise be forced into idleness are kept at work in this way.

Both the Waddell Steel Co. and the Thomas Sheet Steel Co., newly formed interests, are expending considerable sums in the betterment of their properties in a physical way. The Thomas company plans to thoroughly modernize its 12-mill sheet plant acquired from the Sheet & Tube company, while the Waddell company is likewise improving its seven sheet mills, known as the Empire Works. Both of these properties are detached sheet mill plants acquired by the Sheet & Tube company in the absorption of the Brier Hill Steel Co.

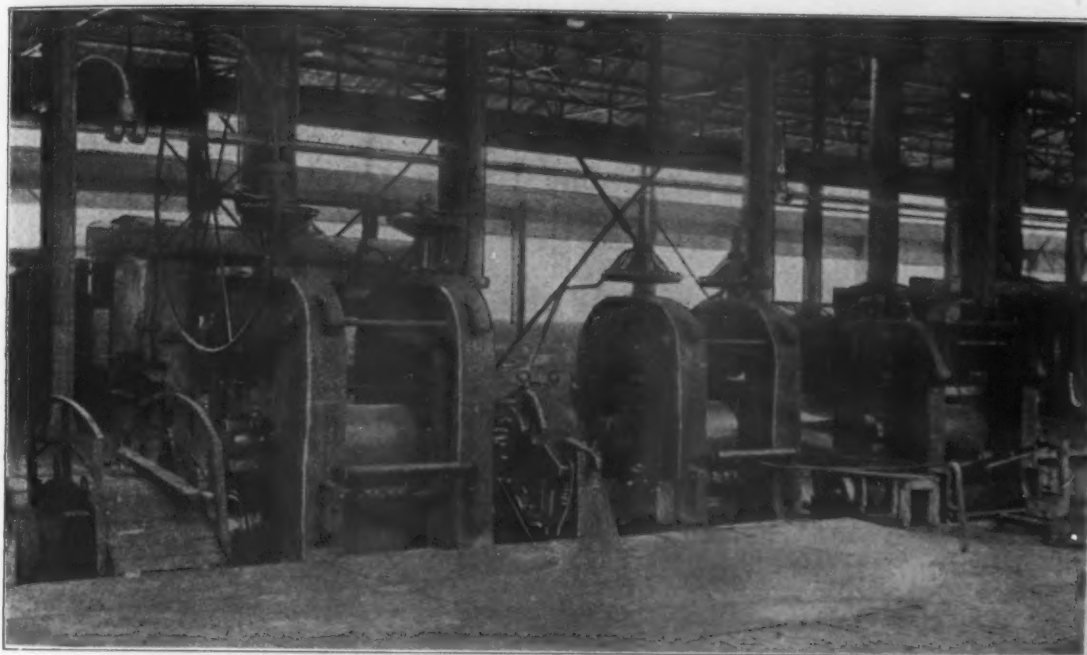
Negotiations for the sale of the Western Reserve works, another detached plant at Warren, acquired in the same way, have been under way, and the Trumbull Steel Co. has been mentioned as a probable purchaser.

In the Chicago district, the Sheet & Tube company is engaged in new construction and modernization on a large scale, improving the plants acquired from the Steel & Tube Co. of America. The principal new construction project at this time in connection with this work is the building of a new modern blast furnace.

Repair work of the character above mentioned is enabling many men to retain employment, whereas operating conditions warrant their temporary layoff.

It is the policy of the leading independent interest at Youngstown to keep its properties abreast of improved developments and in first class physical condition, so as to be able to meet competition at all times. In pursuit of this policy, it does not spare expense in keeping its plants fit and ready for profitable operations when business is on a broader scale than now.

Imports of manufactures ready for consumption are running at a higher rate than last year. The April figures show \$64,100,000, against \$62,400,000 in 1923, while the figures for 10 months show \$634,000,000 this year, against \$590,000,000 in 1923. Not only is the total a larger amount this year, but the percentage to total imports is higher, being 20 against 17 in April, and 21 against 19 in the 10 months of the fiscal year. Correspondingly there has been a sharp falling off in both the amount of crude materials imported for use in manufacturing and in the percentage of that amount to the total imports, both as regards the month of April and the 10 months.



The Length of the Bottom Spindle With the New Drive Is Less Than 6 Ft.

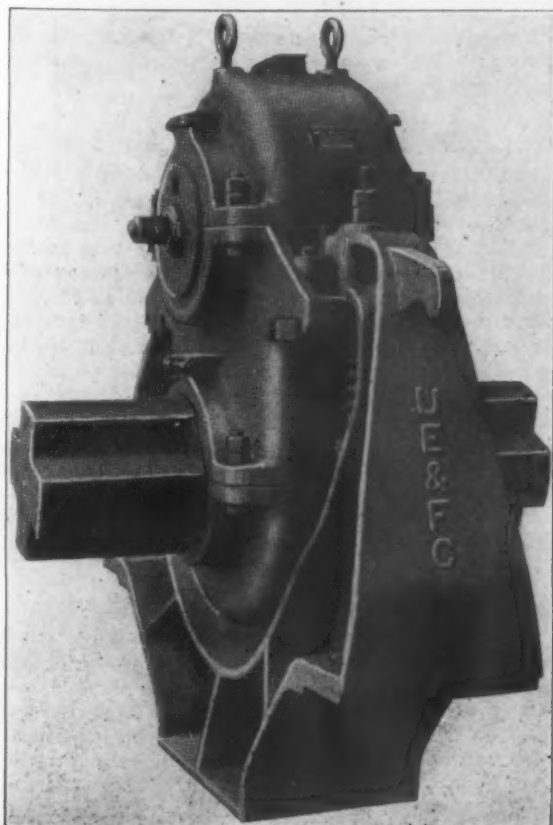
Top Roll Drive for Sheet Mills

In response to an insistent demand for some way of driving the top rolls on balanced roughing stands in sheet mills which would not be cumbersome or expensive, the United Engineering & Foundry Co., Pittsburgh, brought out the top roll drive shown in accompanying illustration. Two of these drives were installed in the new sheet mill plant of the Weirton Steel Co., Weirton, W. Va. They have been in use for almost a year.

The drive itself is described as a glorified spindle carrier. On the bottom spindle is keyed a gear. Around this gear is a case which carries another gear meshing with the one on the bottom spindle. The second gear has an adjustable friction in it and drives a short spindle connecting with the top roll. The case and contents float on springs which are carried by the

frame resting on the shoe plates of the mill. The whole thing is self-contained and may be removed exactly as an ordinary spindle carrier. The gears are totally inclosed and run in grease. The adjustment for the friction on the top gear is just outside the case at the top, where it is readily accessible.

The arrangement permits the use of two finishing stands with a single rougher and allows a single swing from the rougher to either finisher. The length of the bottom spindle with this new drive is a little less than 6 ft., while the length of the two spindles and the pinions, where the ordinary pinion housing is used, is about 14 ft. This means a saving through ground area, buildings, etc., of about 8 ft. long and as wide as the mill buildings. The cost of this new top roll drive is said to be a small fraction of the cost of a stand of pinions and two spindles.



The Bottom Spindle Has a Gear Meshing With One Driving a Short Spindle Connecting With the Top Roll

Gage Steel Committee to Meet

B. H. Blood, general manager Pratt & Whitney Co., Hartford, and chairman of the gage steel committee, has called a meeting of the committee to be held at the General Motors Building, Detroit, Tuesday, June 17, at 10 a. m.

The reports to be given at the meeting are considered to be of special interest and value. The following is a tentative and partial program: General progress report on work of committee; report on wear tests, laboratory tests, service tests; accelerated aging; and dimensional changes with time.

H. W. Bearce, Bureau of Standards, Department of Commerce, Washington, is secretary of the committee.

Copper and the Radio Industry

A survey of the radio industry just completed by the Copper and Brass Research Association discloses that on the basis of an estimated total of 2,500,000 sets in use today, radio apparatus in the United States has consumed 5,000,000 lb. of copper.

The survey indicates that the number of radio sets in use will increase to equal the number of automobiles and telephones in the United States (viz.: 15,000,000) and that this will likely occur in five years' time. In this event, radio manufacturers would use, in the next five years, 5,000,000 lb. of copper annually.

Richard Thomas & Co., Ltd., Llanelli and Swansea, Wales, manufacturer of tin plates and sheets, has moved its business offices to the Bush House, Aldwych, London, W. C. 2, England.

Centrifugal Pipe by a New Process

"Sand-Spun" Iron from a Sand Mold with a Refractory Lining—Developed by a Group of American Foundrymen

AT the convention of the American Water Works Association, recently held in New York, there were displayed by a number of cast iron pipe manufacturers samples of the new sand-spun pipe, a most interesting development in the mode of manufacture of pipe to be used for water, gas, oil and many other purposes. Until a few years ago it had been almost a century since any practical commercial thoughts revolutionizing the methods of manufacturing cast iron pipe had been made public. The previous improved departures from old established methods involved vertical casting in dry sand molds, adopted the middle of the last century.

Prior to this time pipe had been for many years cast on their side—or horizontally—in green sand or non-dried molds with a core having a clay or loam coating. Under this operation, in spite of the core being firmly held at each end, there was a tendency for it to float in the molten iron, making a casting which was uneven in thickness, and this movement of the core was difficult to prevent even with the use of chaplets or anchors.

This vertical or upright casting, insuring an equal thickness in the pipe, was at once popular and the foundries using the old horizontal molds rapidly went out of existence. Many mechanical improvements in the details of running the sand into the molds and of handling the flasks have been developed, but these were only the ordinary and natural changes to be expected.

For more than 100 years engineers throughout the world have been working to develop a machine which would produce cast iron pipe of all kinds centrifugally, but the difficulties they encountered were manifold.

The new sand-spun process just introduced employs the sand mold in a new way. In carrying out this new method the metal, at predetermined temperatures, is poured into a rapidly revolving sand-lined flask, against which the metal is cast without any chilling action.

In addition to this, the centrifugal action of the mold, together with further manipulations thereof, serve to distribute the molten metal evenly throughout the length of the mold, thus securing a pipe of uniform thickness from end to end. The speed or revolution of the mold is such as to cause the metal to be exceedingly dense and solid, thus increasing its tensile strength by more than 50 per cent and making it tough and hard to fracture, yet without interfering in the least with drilling or tapping for service pipe or turning down or threading the exterior or interior for any desired purpose, because all chilling is avoided.

An important feature of this new process, employing the sand-lined flask, is that pipe may be cast of any thickness, heavy or light. Another very important feature is that not only the bell, but the spigot or bead end can be formed by this new method just as easily as it has always been formed by the old sand cast method.

A refractory lining which is applied to the sand mold before casting prevents the burning of the sand to the iron and avoids all scabbing. The sand in the flask is held in place by the centrifugal action. The refrac-

IN THE IRON AGE, March 20, attention was called editorially to the announcement of a group of cast iron pipe makers that a new process of making this product centrifugally would be made public this year. The present article affords the first information concerning this new and important development. It has been furnished by the publicity department of the group of foundries which has perfected the process.

tory material which has been applied to the sand mold is of such a character that during the casting operation it becomes incorporated by a fusing action with the outer shell of the casting, thus forming a very desirable and attractive coating which prevents the formation of rust or corrosion and acts as a protection to the pipe. The finished pipe may, if desired, be coated with the regular Angus Smith or other tar varnish or

coating, and can be coated on the interior with a cement or other lining material to prevent the formation of tubercles which are sometimes formed by certain characters of water or other fluids, and this coating preserves the coefficient of the flow of fluids through the pipe.

Cast iron pipe made by the new process in centrifugal sand lined molds has been thoroughly tested in the usual way in hydraulic presses, individual pipe being tested to 2400 lb. per sq. in. without showing defects.

Bars made from the actual casting have shown over 30,000 lb. per sq. in. in tensile stress, and proportionate results in transverse and breaking tests.

This new sand-spun pipe is now being regularly made and marketed. Enlarged and up-to-date foundries are being built and old plants are being reconstructed for the installation of the new method, all of which will supersede the methods now employed. The new method is protected by patents of a fundamental character and which cover not only the process, but the machinery and the product.

Malleable Castings in April

Malleable castings produced in April by 132 plants amounted to 58,634 tons. Shipments were 57,238 tons, orders booked, 45,955 tons, and operations were 53.7 per cent of capacity, the latter being 109,131 tons monthly. These figures, given out May 29 by the Bureau of the Census, show conditions not so favorable as in March, when 133 plants with a capacity of 109,414 tons operated at a rate of 66.5 per cent and produced 72,807 tons, shipped 65,630 tons, and booked orders for 60,326 tons.

Comparing 109 identical plants, the report shows that operations were 54 per cent in April as against 66.2 per cent in March. Production of these plants in April was 50,978 tons, shipments, 49,640 tons, and orders booked, 39,163 tons. Production in March of the same group of plants was 62,055 tons, shipments, 55,751 tons, and orders booked, 53,581 tons.

Diesel Engine Equipment

WASHINGTON, June 3.—President Coolidge has before him for signature the bill authorizing the Shipping Board to use not to exceed \$25,000,000 for the equipping of vessels with Diesel engines. The conference report on the measure was adopted last week after the House conferees had accepted amendments introduced in the Senate to make the language clearer in defining the type of machinery to be installed. The Senate conferees agreed to the elimination of Senate amendments removing the restrictions required on loans.

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ESTABLISHED 1855

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The Socialistic Tax Bill

THE tax bill that was finally passed by both houses of Congress with all but unanimity is a socialistic measure. President Coolidge has signed it, at the same time saying that it is not sound but affords some temporary relief and that he hopes the next session of Congress will correct its defects. It is not unlikely that Congress both knew and did not know what it was doing, or that it knew what it was doing, but not whither it was leading.

We have in our present political situation something that is both portentous and very paradoxical. The President is so popular that he probably will receive the Republican nomination by acclamation. His popularity is founded without doubt upon the conviction that he is striving simply to promote the common welfare. Nevertheless his economic recommendations have been deliberately flouted by Congress, and by great majorities.

The superficial comment respecting this has been that Congress is composed mainly of politicians, whose eyes are always especially on the lookout for their own welfare. That is probably true, but we must concede that politicians have to possess intelligence in order to succeed in their profession sufficiently to arrive in Congress. The same intelligence should prevent them from writing their own sentence to decapitation, although being human they sometimes make mistakes like all other professional men. It is hard to believe, however, that Congressmen would almost unanimously make a professional mistake, although it might easily make an economic mistake, such as repudiating the law of supply and demand, or a scientific mistake such as voting that Dr. Cook discovered the North Pole.

It follows that Congress must have believed that the people approved the wicked things it has been doing; in other words, that Congressmen are better representatives of their constituents than many of us have given them credit for being. At the same time the people approve and admire the President. This is the great paradox.

The explanation may be that the popularity of the President rests upon sentimental grounds, but that the people do not understand his

economic arguments and have been wishful for the very things that Congress has given them. Not understanding the President's arguments showing why they should not have these things, not even having the mental capacity to understand them, they have refused to accept his recommendations. It is easily conceivable that at the next election the vote of the morons and near-morons might reelect the President by an immense majority and at the same time reelect the present Congress, or one equally bad, that would continue to pass outrageous bills over Presidential vetoes. It would require a Mussolini to correct such a condition. Indeed the present state of legislative affairs in the United States is perhaps not very different from what it was in Italy when Mussolini seized the power and practically abolished the Italian Parliament.

We have a dreadful suspicion that Congress knew what it was doing when it voted the soldier bonus. Did not the people of the State of New York vote likewise by specific referendum last fall? Why should not the mass of the people now welcome a system of taxation that gives them the service of Government largely at the expense of a relatively small class of people? It is indeed terrifying to look at the state of mind in this way; but why not face the grim reality? The arguments of Mr. Coolidge and Mr. Mellon that taxation of the few for the immediate relief of the masses is bound to react against the masses themselves falls on sterile ground; for most people are incapable of visualizing the process whereby that results. This is why Congress repudiates the President as an economist while the people applaud him sentimentally.

The new tax law makes a substantial reduction in rates, which is as should be, for obviously it is foolish to extract from the people more money than is needed. It does not do this in the scientific way that Mr. Mellon proposed, but it does it in a more popular way, as the politicians sensed. The reduction is greatest on the small incomes and much less on the large ones, which is socialistic and confiscatory. On the very large incomes the surtaxes are reduced but little, wherefore they will continue to shrink as tax gatherers at all, and by being diverted to tax-exempt securities those incomes will lose their economic

productiveness and thereby will help in keeping prices high.

Mr. Mellon proposed to rebate a portion of the taxes on all earned incomes. Congress limits that to incomes of less than \$10,000. In principle this is one of the very vicious things of the new law. Heretofore Congress has been punitive against great fortunes. Now it becomes punitive of the mere ability of the men who earn by their own efforts more than a moderate income. This is the purely socialistic doctrine that special talent should be made to work for the State.

To complete this socialistic measure the taxes on inheritances are increased and a new tax is laid on gifts, while most of what there has been of the nature of consumption taxes is removed.

Thus in theory, while taxes in the aggregate are reduced, our system is designed to be even more of a social leveler, and a punisher of both wealth accumulated by work and thrift in the past and of work yielding superior reward in the present. The looting of wealth and talent is bound to lead to economic impairment that Mr. Coolidge and Mr. Mellon can foresee but to which Congress is blind and which the people will not appreciate until it begins to pinch them and hurts.

The American people would be deeply shocked if they considered that they had become saturated with socialistic poison. The socialistic spirit that has pervaded our recent legislation is not the gentle and sentimental, though fatuous and impracticable, thought that is founded upon the principles of Christianity itself, but is rather the selfishness of legalized Bolshevism. Economically this is tending to impair our national welfare exactly as happened in Russia, but not with the swiftness and violence of fire and sword as there. We wish that the few sane leaders we still have would take their stand on principle rather than upon economic arguments appealing to reason that does not exist.

Cultivating Railroad Machinery Trade

MACHINE tool purchasing for railroad shops is bound to be more and more along the lines of production machines. Even without the influence of the standardization in other metal working industries and the adoption of mass production and approaches to mass production resulting therefrom, the attitude of railroad shop labor is forcing consideration of the use of those methods which transfer the skill from the man to the mechanism. Certain of our large railroad systems have gone far along the road to standardization of design and thus of construction and repair. Not long ago several illuminating articles were published in *THE IRON AGE* pointing out what had been done in standardizing details and providing jigs and fixtures to increase output and lower cost.

The lesson is that both builders of machine tools and dealers should cultivate the shops as they have not done in the past. Discouraging experiences will be repeated and rebuffs still will be met, but the ranks of master mechanics, shop superintendents and other executives are gradually being changed as to man caliber and the

new day is dawning of thorough appreciation of the facilities offered in modern tools. The time and effort necessary may seem inordinate, judged by immediate results, but if some of the assertions made at the recent conference in Buffalo between the manufacturers and dealers in machine tools are taken at face value, there need be no great concern over fruitful results of sales work at the point of use.

Mr. Baker's Gift to Harvard

THE splendid \$5,000,000 gift of George F. Baker to the Graduate School of Business Administration at Harvard University is gratifying not only to the business interests of the country but to all who are anxious to see business placed on a higher plane of efficiency and ethics.

When the first effort to give instruction in business in an American college was made at Harvard in 1908 there were expressions of doubt as to its practicability, just as was the case at first with the teaching of journalism, but the results at Harvard, Dartmouth and some of the State universities have shown that much can be accomplished in graduate schools in equipping young men for a career in business. The demand for the services of the graduates is proof of the confidence business men have in them.

It does not appear that these courses are designed to equip for any particular business, but they do give the young men training which enables them to progress more rapidly after they enter into active business pursuits. To a graduate in the regular course at the age of 22 or 23, two years seems a long period to add to his collegiate career, but the carefully compiled statistics of the college of business administration clearly establish that those who take the additional training are in a few years a considerable distance ahead of other young men who have not had the advantage of post-graduate work.

Mr. Baker writes that he is especially impressed with the determination to make the Harvard school of the first importance in the country, and he might have said to the country, for in putting a business career on a plane with the professions a great service is rendered to the country through trained young men who are instilled with higher ideals of business. As Bishop Lawrence said, Mr. Baker's gift is unique in the annals of American education, but if it brings about the results aimed at, it will be highly suggestive to other business men who have attained distinction. May many of them have the liberality and the vision of George F. Baker.

I PLEAD for market research that will show all how best to sell the master tools of industry.—From Ernest F. DuBrul's address at the Buffalo meeting of the National Machine Tool Builders' Association, May 22-24.

Steel buying can be deferred just so long; then purchases become imperative. But the time when a new machine tool must be purchased is indeterminate, for the old tool can be made to do; it can be repaired. As it is generally agreed that for the next few years the greater portion of

machine tool sales will be to replace existing manufacturing capacity rather than to create additional capacity, one answer to the problem is unceasingly to impress upon machine tool users the economic waste involved in using obsolete or worn-out equipment. But the machine tool builder must do more than simply prove to his trade that his machine will perform a certain operation at a lower cost. He must bring about a state of mind favorable to the expenditure of money for that machine. The creation of this state of mind must precede all other measures for improving the machine tool business.

Larger Sheet Mill Outputs

WHETHER men are working harder has been talked about much more than investigated. No doubt many employers have made studies of their own, but there has been little published to show what is going on in industry generally. Statistics gathered with respect to performance of sheet mills in the years 1922 and 1923 are of great interest, both on account of the size of the operations involved and because the output of a sheet mill is dependent so largely upon the efforts of the men, not only the efforts of the individuals, but the team work done, since all members of the hot mill crew must work together.

The figures were given briefly in an abstract in THE IRON AGE of May 22, page 1522, of the address of W. S. Horner, president of the National Association of Sheet and Tin Plate Manufacturers at the annual meeting of sheet steel executives. The statistics were of mills representing 95.6 per cent of the independent sheet steel capacity of the country, with an annual productive capacity, as rated, of 3,370,000 net tons. The operation for each year was given in two ways: First, the "mechanical operation," computed by the number of turns worked relative to the total number of turns in the year; second, the tonnage output relative to the estimated tonnage capacity. The figures for the two years, in per cent, were as follows:

	Mechanical Operation	Tonnage Production
1922.....	77.2	74.3
1923.....	78.4	81.5

In 1922 the output was 4 per cent less than it would have been had the mills produced, when running, at rated capacity. In 1923 the output was 4 per cent more than the expectation based on rating. In other words, from one year to the next the average output per turn worked increased fully 8 per cent. That increase is attributable chiefly to the men working better. Presumably an exhaustive analysis would show some other influences affecting the output, such as weather conditions, character of orders, improvements at some mills, etc. But comparing one whole year with another whole year these influences would be almost insignificant in effect upon the entire showing, and the conclusion is warranted that the principal point is that the men worked better from one year to the next.

In drawing general conclusions from this presentation, the fact must be borne in mind that the men chiefly involved in the showing are paid by

results. Their wages are purely tonnage wages. They can produce more or less according to the skill they employ, but the skill does not offset manual labor. The skill is in crowding more work into the turn of eight hours, and when the tonnage is greater there is correspondingly more manual labor. It is not a case of skill developing short cuts. While many men in the sheet mills are employed by the day, it is almost wholly a case of the tonnage men controlling the output of the plant.

It may be of incidental interest to note that the standard capacity rating adopted by the sheet association is 7.65 net tons per turn for sheet mills and 22.635 net tons per turn for jobbing mills. In each case a year's work is regarded as 50 weeks of 16 turns.

In steel mill operations tonnage results vary according to the weather, and a single month's showing is not particularly indicative. However, it is worth noting that last March the reporting sheet mills had a mechanical operation of 87.0 per cent, in turns worked to turns possible, while their output was 96.5 per cent of the rating. Thus in that month the outputs averaged 11 per cent over the rating, against the 4 per cent excess shown for the whole of 1923.

Science in Production and Sales

IF a piece of steel is improperly heated it will not roll into good merchantable material and the mill is punished by having a piece of scrap on its hands. The law of nature penalizes the manufacturer just to that extent—a fine of a few dollars.

Material, whether steel or something else, is produced through a succession of more or less intricate processes, involving at every step the use of such science as is available, for the one purpose of selling the product. For all the pains, energy, skill and employment of capital resources involved in the production there is the one compensation, a certain number of dollars received for the product by way of its sale.

When it comes to selling the material, the spirit of the times is that the selling should be governed by economic laws, as the production has been governed by the laws of chemistry, physics, etc. When it comes to defining economic laws, however, there is little that seems to be definitely allowed but the law of destruction. If the seller for any length of time receives too much, there will be competition, destroying his extra profits at least. If he receives too little he goes into bankruptcy and is completely destroyed.

That is much the same as if the piece of steel when improperly heated should blow up the whole mill, instead of merely imposing a penalty of a few dollars by the production of scrap instead of salable material. The commonest things of life often escape attention, when frequently they deserve the greatest attention. In the manufacture of goods for sale this common thing, the idea that science is at hand everywhere in production and is not permitted in selling, receives but little attention, whereas it should receive much attention, as its rank foolishness deserves.

Several automobile makers have announced price

advances, based on the reasoning that with lighter production a larger margin per car is requisite. One car, the daily production of which has run well into four figures, goes up on July 1 by \$5 on open models and \$15 on closed models.

In view of the principle involved, these price advances are startling news. Where is the court decision, legislative enactment or Washington departmental pronouncement that recognizes the propriety of a seller taking the steps necessary to conform to this economic law, for in the long run it is an economic law that the overhead has got to be distributed or the enterprise fails? The notion commonly followed is that instead matters must be allowed to take their course until the enterprise blows up.

If the manufacturers of a given commodity attempt so simple a thing as endeavoring to adjust their sales to economic law by gathering information as to consumption, demand, sales, shipments, stocks and production, they are suspected, if not held confessedly guilty, of conspiring against the welfare and security of the United States.

It is the height of absurdity to deny manufacturers the use of any science in their selling and in regulating their production and stocks to the requirements of their market. That denial is precisely involved in the prohibitions that exist, for if the methods the trade associations have attempted to employ are not right or scientific then the right and scientific methods should be discovered and proposed.

IN spite of a falling off of 23,423 tons per day in the output of pig iron in May from that of April—the greatest drop in a single month of which we have record, exceeding by 600 tons even that of the 1919 strike period—production for the calendar year to date remains large. The total of 15,408,000 tons for the five months has been bettered in only three years in our history: in 1916, with 16,199,000 tons; in 1917, with 15,800,000 tons and in 1923, with 17,165,000 tons. And the month of March, this year, showed the highest total yet recorded, with the exceptions of one month in 1916, one in 1917 and five in 1923.

CORRESPONDENCE

Man Element in Industry

To the Editor: I was very much interested in reading the editorial in THE IRON AGE for May 29 entitled "Business Forecasting," as it discusses a subject in which I have been interested for a number of years.

I have long been a silent opponent of the original Taylor program, though fully recognizing the wonderful work he did in its broad aspects and its far-reaching and beneficial reaction on industry. I say silent, because with the overwhelming enthusiasm for high pressure production methods, it required a good deal of daring to attempt to criticize anything that Taylor said. Individually, as occasion arose, I have repeatedly made the statement that manufacture was like a three-legged stool, the legs being materials, machinery and men, the greatest of these being men, for they take the raw material and through the use of machinery turn it into useful products. Materials and machinery have

idiosyncrasy but they are inanimate and consequently devoid of any self-starting action.

A man, on the other hand, is not only a machine but is full of curious inconsistencies, and having a mind, even though at times immature and crude, can originate resistive methods or action that will destroy the best laid plans, or make them only partly operative.

For several years, following the Taylor exposition of efficiency methods, a great many jumped into the field and did everything they could to make a pure machine out of the man element. In my judgment, we have got to work together more and more to a perfect recognition of the human element or humanity in industry.

JN. JO. SWAN.

New York, June 2.

WAGE SCALE AGREED UPON

Predicted Strike in Sheet and Tin Plate Mills Will Not Be Called

PITTSBURGH, June 3.—An agreement was reached at noon today at the annual wage scale conference in Atlantic City between sheet and tin plate manufacturers and the wage scale committee of the Amalgamated Association of Iron, Steel and Tin Workers whereby the 1923-24 wage scale will be continued for one year without change. It will be recalled that the annual convention of the Amalgamated Association at Pittsburgh in April adopted the report of the wage scale committee embodying stiff increases over the 1923-24 scale for presentation at this conference. The satisfactory issue from the conference, which has been in progress since May 27, means that there will be no suspension of sheet and tin plate mills working under an agreement with the Amalgamated Association on June 30, as was predicted in some poorly informed quarters about a month ago.

The Iron Age and Its Readers

THE American Iron and Steel Institute has just completed its compilation of the production of rolled steel in 1923. A hurried survey shows that our estimate, published on Jan. 5, in our Annual Review Number, was 2¼ per cent too low. While in the case of different forms of steel, our calculations were not all so close, being based on the helpful figures of steel producers, who necessarily had to guess for December, the object of our first of the year analysis was to give not merely how much of the different forms were made but how much of each form different industries took—an examination of the channels of consumption which the institute is not yet prepared to make.

Our total of bars was ½ per cent more than the 5,828,000 tons of merchant and concrete bars, as found by the institute. We were 2¼ per cent higher than the 3,404,000 tons of structural shapes produced. Our figure for rails was 4 per cent low and that for plates and sheets, including black plates for tinning, was 4¼ per cent low.

All of which means that if the cooperation of producers is increased in number to the same extent in the coming December as it was in December, 1923, as compared with December, 1922, the estimate for the current year, to be given as the new year dawns, will be even more valuable as a help in shaping sales and other policies in the new year than the estimates we have given for the last two years.

European Steel Markets Are Marking Time

British Business Volume Poor—German Prices Weakening
—Coal Strike Has Closed Many Plants—French
Waiting for Political Stability

(By Cable)

LONDON, ENGLAND, June 3.

PIG iron weakness continues. Export sales are hampered by Continental financial conditions. Domestic trade is quiet also. Hematite is dull and easier. Foreign ore is quiet. Bilbao Rubio is held nominally at 23s. 6d (\$5.08) c.i.f. Tees.

Finished steel is quiet, there being very few decent sized inquiries apart from colonial government orders. Makers of sections are inclined to accept lower prices, but plate rollers maintain a firm attitude.

Western Electric Co., Ltd., London, has secured the first contract for reconstruction of the telephone systems of Japan, at a cost of £750,000 (\$3,240,000).

Clyde shipbuilding output in May consisted of 37 vessels launched, aggregating 44,455 tons gross register.

Continental steel is quiet. Some merchant transactions are passing, but the works are securing few orders, owing to the uncertainties as to prices and times of shipment.

In Germany the bulk of the striking Ruhr miners have returned to work. Meantime, industry has been badly hit. Krupp had begun to curtail and Thyssen already had blown out blast furnaces at Hamborn and Brückhausen and ceased work at the Dinslaken plants. The Phoenix Co. has closed down more or less completely at Hoerde and Ruhrort and the Dortmunder Union and Bochumer Verein were contemplating complete shutdowns, as also were the Niederrheinische Hütte and Gutehoffnungshütte. The Stahlwerk Becker was closing down gradually, owing to its failure to secure credits.

Tin plate bars have been reduced 6s. 3d. to £8 12s. 6d. (\$37.26). The tin plate minimum has been reduced 10½d. basis to 22s. 7½d. (\$4.89) basis, IC f.o.b. Bristol Channel ports. The market is quiet, but a revival of demand is expected as a result of cheaper prices.

Galvanized sheets are strong. There is heavy buying, chiefly of 24-gage corrugated sheets for Indian

markets, but other markets also are interested. Makers now are well sold for several weeks ahead.

Black sheets are firm, with strong demand. Japan thin specifications 6 x 3, 13's, 107 lb., now are quoted £18 5s. (3.57c. per lb.) f.o.b. Very little material is obtainable before September shipment. Other gages are in good request for all markets.

FRENCH WATCHING POLITICS

Market Conditions Not Improving—German Competition Hurts—General Quietness Prevails

PARIS, FRANCE, May 23.—Recent political events in France have caused great uneasiness on the market and business remains small; a revival should not be expected anyhow before the composition and the tendencies of the new Cabinet are known. Conditions of exchange are not improving the situation; the rise of sterling and dollar is not so accentuated as to enable us to reconquer our export position; but it is sufficient to make us bear the weight of an increase in the price of raw materials we have to import. Inland prices have continued to fall, but at a slower rate, owing to the fall of our currency.

Coke.—Up to now, and in spite of the Ruhr conflict not being settled, the deliveries to the ORCA do not seem to have been diminished in the proportions that were first anticipated, since they were for the first 20 days of the month on the average of 184,975 tons, or 9250 tons a day. The ORCA was definitely constituted on May 16 under the form of a joint stock company, with variable capital, and the statutes of the late SCOF. Mr. de Wendel is president and Colonel Pineau is director.

We have stated already that the price for indemnity coke was maintained at 150.75 fr. (\$8.24 per gross ton) on trucks at Sierck, all ORCA charges included, for the month of May. In Meurthe-et-Moselle some German coke (non-indemnity) is being offered at 143 fr. (\$7.81) per ton delivered. In such conditions, one wonders how the French Government could accept the price

British and Continental prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.32 per £1, as follows:

Durham coke, delivered	£1 8s.	\$6.05
Bilbao Rubio ore†.....	1 4	5.18
Cleveland No. 1 foundry	4 16	20.74
Cleveland No. 3 foundry	4 10½ to £4 11s.	19.55 to \$19.66
Cleveland No. 4 foundry	4 10	19.44
Cleveland No. 4 forge..	4 9	19.22
Cleveland basic.....	4 11½	19.77
East Coast mixed.....	4 18 to 4 18½	21.17 to 21.28
East Coast hematite...	4 19 to 5 0	21.38 to 21.60
Ferromanganese.....	17 0	73.44
Rails, 60 lb. and up....	8 10 to 9 10	36.72 to 41.04
Billets.....	8 0 to 8 5	34.56 to 35.64
Sheet and tin plate bars,		
Welsh.....	8 12½	37.26
Tin plates, base box...	1 2¾ to 1 3	4.89 to
		C. per Lb.
Ship plates.....	9 5 to 9 15	1.78 to 1.88
Boiler plates.....	13 0 to 13 10	2.51 to 2.60
Tees.....	9 7½ to 9 17½	1.81 to 1.90
Channels.....	8 12½ to 9 2½	1.66 to 1.76
Beams.....	8 7½ to 8 17½	1.61 to 1.71
Round bars, ¾ to 3 in.	9 17½ to 10 7½	1.90 to 2.00
Galvanized sheets, 24 g.	17 15 upward	3.42
Black sheets, 24 gage..	13 0	2.51
Black sheets, Japanese		
specifications.....	15 5	2.94
Steel hoops.....	12 10 & 12 15*	2.41 & 2.46*
Cold rolled steel strip,		
20 gage.....	17 2½	3.30

*Export price. †Ex-ship. Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Nominal)			
Foundry pig iron:			
Belgium.....	£4 5s.		\$18.36
France.....	4 5		18.36
Luxemburg.....	4 5		18.36
Billets:			
Belgium.....	6 2½		26.46
France.....	6 2½		26.46
Merchant bars:			
		C. per Lb.	
Belgium.....	6 17½ to £7 0s.		1.33 to 1.35
Luxemburg.....	6 17½ to 7 0		1.33 to 1.35
France.....	6 17½ to 7 0		1.33 to 1.35
Joists (beams):			
Belgium.....	6 17½ to 7 0		1.33 to 1.35
Luxemburg.....	6 17½ to 7 0		1.33 to 1.35
France.....	6 17½ to 7 0		1.33 to 1.35
Angles:			
Belgium.....	8 0 to 8 5		1.54 to 1.59
½-in. plates:			
Belgium.....	8 2½		1.57
Germany.....	8 2½		1.57
¾-in. plates:			
Luxemburg.....	8 2½		1.57
Belgium.....	8 2½		1.57

of 145.25 fr. (\$7.93) for reparation coke (to the exclusion of the supplementary charges of the ORCA) while the Germans are selling coke in our country—including all customs, tax and transport charges—at a price noticeably lower than that credited to the Reich on reparation account. Moreover, in the same region of Longwy, some Dutch would also be offered for the price of 132 fr. (\$7.21) delivered.

Iron Ore.—The trend of the market is changed. Production is hardly sufficient to cover our home demand and that of Belgium and Luxemburg, at least, as far as high grade ore is concerned, and deliveries have to be deducted from the stocks. The mines encounter a shortage of labor. Prices are noticeably higher. Briey is worth 20 to 26 fr. (\$1.09 to \$1.42), according to grade, and Thionville, 16 fr. (\$0.87); yield, 32 per cent basis. We continue to export to South Wales and Scotland, but at a slower rate, owing to lack of available ore. The amount of Thionville ore bought by Germany is actually half of the tonnage exported before the Ruhr occupation, and her purchases in Briey are 4000 to 6000 tons a month.

Manganese ore, above 48 per cent, is firm at 24 fr. (apparently \$13.10 per gross ton, or 27.3c. per unit) c.i.f. Antwerp, because of its scarcity and of the great demand. The French Comptoir for manganese has just issued an order for 25,000 tons to the Cie. Belge des Mines, Minerais et Métaux, at a price a little over 24 fr.

Pig Iron.—Quiet market and unaltered conditions. The impression is that disposals in chill-cast iron are not very abundant; however, prices continue to fall. The average price turns around 380 fr. (\$20.76), rather under than above. A founders' cooperative association is selling Lorraine iron at 370 to 375 fr. (\$20.21 to \$20.49); Homécourt has quoted 365 to 370 fr. (\$19.94 to \$20.21), and Hagondange 364 fr. (\$19.89), for the Luxemburg grade No. 3, yield 2.30 to 3 per cent Si. Other firms of the East region, making desired irons, and still well supplied with orders, are able to quote 390 fr. (\$21.30) and even 400 fr. (\$21.85) per ton at mills. The Belgians are keeping their price for chill-cast No. 3 to 390 to 400 fr., but the same quality of Belgian iron (transported by sea) has been sold in the region of Bordeaux for 355 French fr. (\$19.39) per ton and 350 French fr. (\$19.12) in the region of the Ardennes (in 50-ton lots). Along the French frontier the Belgians have also offered some basic iron for the very low price of 330 to 350 fr. (Belgian currency) at producers' works. Since the pound has again been raised to 78 to 80 fr., the introduction into France of British iron is rather difficult; Cleveland No. 3 GMB is worth at least £5 c.i.f. Rouen, or 390 fr. (\$21.30), and mixed numbers of the East Coast, 10s. more, or 430 fr. (\$23.49) about, and 500 fr. (\$27.31), delivered in the Paris area, while in the East and Center regions, French iron, even a little firmer than last week, on account of exchange, is worth only 425 fr. (\$23.22) at mills, and 410 to 420 fr. (\$22.40 to \$22.94) in the Pas-de-Calais; other producers quote higher rates, either on account of the quality of their iron or on the number of orders on hand.

Ferroalloys.—The market encounters a further rise in ferromanganese, in sympathy with that of sterling. The 76 to 80 per cent Mn. is worth 1475 fr. (\$80.58) delivered. No change in spiegel.

Semi-Finished Products.—If buyers were more numerous, the fall in prices would soon be stopped, as exchange is rising and the Ruhr conflict may bring difficulties in the supply of coke. In basic steel, and per 100 kilos, at works, blooms are worth 43 to 44 fr. (\$23.50 to \$24.04); billets, 45 to 46 fr. (\$24.58 to \$25.13). In Belgium, the plants are asking prices judged excessive for the moment, as they are quite busy. The Lorraine and Luxemburg ask £5 17s. 6d. and £6 (\$25.90 and \$26.46) for billets; £6 2s. 6d. to £6 5s. (\$27 to \$27.56) for targets. The Germans quote 475 to 480 fr. (Belgian) for billets, (398.50 fr. French currency or \$21.77) f.o.b. Antwerp.

Rolled Steels.—The plants are actually making interesting tenders for large samples, channels and beams, to attract business. Beams are quoted as low as 55 to 56 fr. per 100 kilos (1.34c. to 1.37c. per lb.) at mills,

and even less. The situation is better in small and medium shapes, as there are still many orders to execute; the average quotation is 58 to 60 fr. (1.41c. to 1.46c.) delivery 8 to 12 weeks.

More and more, the plants have a tendency to deal on all types of shapes at one price only; for 210 tons of mixed shapes, a Meurthe-et-Moselle firm (East) asked 60 fr. per ton (1.46c.); 67 to 70 fr. (1.63c. to 1.71c.) delivered Center was asked in the same region for a large order; important tonnages, comprising but a few different types, have been sold for 56 to 57 fr. (1.37c. to 1.39c.) per ton. F.o.b. Antwerp, the Belgian plants ask £7 (588 French fr. or 1.43c.) for bars and beams, while the Luxemburg plants ask the same rates but would be inclined, as the Lorraine, to some concession on the prices. The Germans ask as little as £6 15s. to £6 17s. 6d. (1.33c. to 1.35c.).

Sheets.—Quiet conditions prevail, more so than during the week just ended. There are needs that plants hesitate to cover, owing to the instability of prices tending downward. Sheets 5 mm. (6½ gage) and above are quoted 70 to 75 fr. (1.71c. to 1.83c.) basis; 3 to 4 mm. (11½ to 9 gage) 76 fr. (1.85c.); 2 to 2½ mm. (14 to 13 gage), 85 to 88 fr. (2.07c. to 2.15c.); light, 98 to 105 fr. (2.39c. to 2.56c.). Delivery six to eight weeks, and three to four months for structural sheets.

Wire Products.—Depressed by lack of trade. Prices unaltered but with a tendency to ease. Wire nails and wire rods are getting near 100 fr. per 100 kilos (\$54.63) per gross ton.

GERMAN MARKET WEAKENING

Prices Falling and Works Being Closed—Credit Famine Continues

(By Radiogram)

BERLIN, GERMANY, June 2.—The market still is weakening. The price of steel bars ex-works has fallen to 130 gold marks per metric ton (1.40c. per lb.).

Owing to lack of coal and coke, as a result of the Ruhr strike and lockout, many works, including those of August Thyssen, have reduced production and the Krupp works have given notice of the discharge of 30,000 men.

For pig iron, steel bars and steel sheets there is fair domestic demand, but export demand is declining. The Solingen fine steel branch of the industry (including tools) reports increasing orders.

Business is affected injuriously by a continuance of the extreme credit famine and by uncertainty as to the position of matters after the expiration of the Ruhr Iron Masters' agreement with the French on June 15.

GERMAN CREDIT UNDULY DEAR

In Spite of Its Throttling Effect, Improvement Is Noted—Wages Below Pre-War in Buying Power

BERLIN, GERMANY, May 15.—The condition of industry and home trade continues to improve with exceptional speed, fully justifying against pessimists the currency stabilization policy of the Stresemann-Marx cabinets last winter. By April 15, the date of the latest figures, the number of totally unemployed in unoccupied territory had fallen to 460,000, against nearly 1,600,000 at the beginning of the year; and the number at date of writing is undoubtedly much less. In Berlin metal industries unemployment, which last winter was five times more than in average pre-war winters, has fallen to about the pre-war normal.

It is nevertheless feared that a slight reaction in iron and steel activity is due. The credit crisis is still extreme. The banks demand (including various commissions) 60 to 90 per cent per year interest on first class security. The Reichsbank has been obliged to refuse to increase advances to individual firms above the totals outstanding on April 7.

The credit demand is in great part due to the rapid

industrial recovery. A Chamber of Commerce report mentions that iron and steel concerns, not content with attaining pre-war production level, are still trying to expand; and it is doubtful whether the market will absorb all that is produced.

Steel More Readily Obtainable

Westphalian steel producers, who until lately were demanding three months delivery terms, have reduced the terms to six or eight weeks. The strong demand for pig iron continues and the call for semi-finished material has increased. The demand for bars has somewhat fallen off, and thick and medium-thick sheets are little in demand, but orders for thin sheets and wire come in plentifully.

Works receive abundant inquiries concerning delivery of steel rails, but orders are few; and the rolling stock market is dull, as for months past. The Thyssen corporation lately received an order from the Swedish State Railroads for 8000 tons of steel rails, and further rail orders from six Swedish private railroads. Thyssen's bid for the state railroad order is said to have been 45,000 crowns lower than that of the next competitor. The Rhenish Steelworks Co. has in the last few months received Swedish orders for 18,000 tons of rails.

The Solingen fine steel branch has rapidly recovered, and has now no unemployment worth mentioning. The Leipzig Spring Fair brought Solingen plenty of home orders but few foreign. From the Renscheid and Velbert districts is reported a good demand for tools, locks, fittings and small iron goods generally; but here, also in the Hagen and Schmalkalden iron districts, expansion is checked by lack of credit. The foundries, which also report improving conditions, put up prices 10 per cent on April 15, and a further 4 per cent on May 4.

Slightly Enhanced Prices

In the last month general prices have been slightly upward. The Federal wholesale index (100 in 1914) for May 6 was 125.2 against 120.8 on March 25; the cost of living index on May 7 was 115 against a low point this year of 103. Metal prices have risen only slowly, the last price for bars, ex-works, being 145 to 155 gold marks per metric ton (1.57c. to 1.67c. per lb.) against 145 to 150 marks at the end of March, construction forms 143 to 150 marks (1.55c. to 1.62c.) against 140 to 143 marks, and thin sheets (under 1 mm. or No. 19½ gage) 190 to 210 marks (2.05c. to 2.27c.) against 190 to 205 marks.

Ore deliveries are sufficient. The Rhenish-Westphalian smelters have resumed the importation of Canadian Wabana ore, the first order being for 125,000 tons, given through the British Empire Steel Corporation. Deliveries of French minette are hampered by the inadequate loading facilities of Strassburg harbor.

Hours and Wages

Labor conflicts over wages and working hours are common. Scandinavian newspapers have begun an agitation against "German social dumping," which replaces the former "exchange dumping." "Social dumping" means underselling as result of cheap production, due to the now more or less general 56 to 60 hours working week, which has followed the suspension of the 8-hr. labor law. Although German underselling is not now universal, it is impossible for a high wage and short working hour country like Sweden to compete in the fine mechanical industries with Germany, the more so because the present lengthened German labor hours have materially increased the collective productive capacity, and because per capita production per hour is steadily increasing.

The last German wage reports are for March, since when there has been little change. Then the average wage for skilled workers in mining was only 33.78 gold marks (\$8.05) per week, in the metal branches 30.99 marks (\$7.39), and in eight leading branches 29.56 marks (\$7.04). As this 29.56 marks has only the same buying power as 27.57 marks (\$6.67) before the war, a low standard of living is inevitable. The real wage of workers in the eight branches averaged in March 78.7 per cent of that of 1913; while the real wage of un-

skilled workers averaged 89.8 per cent. These earnings are in those works which have put in force the lengthened working day. In the minority works, which still observe the 8-hr. day, the average weekly wage for skilled workers is only 28.16 gold marks (\$6.71), unskilled 22.32 marks (\$5.32). Therefore \$5.50 to \$7 a week may now be considered a normal German wage.

As the legal maximum rents are now being slowly put up, wages will increase, but not by much. It is doubtful whether German production costs proper are as high as manufacturers declare, and whether the dearth of credit is not a main cause of the high prices at present charged.

FRENCH EXPORTS AND IMPORTS

Iron and Steel Movement in First Three Months of 1924 and 1923

PARIS, FRANCE, May 23.—Iron and steel imports and exports for the first three months of 1924, compared with the same period in 1923, were:

Pig iron: Imports, 13,037 metric tons in 1924 against 16,561 in 1923. Exports, 215,713 tons against 200,938 tons.

Ferroalloys: Imports, 395 tons against 2239 tons. Exports, 6042 tons against 4516 tons.

Iron and steel: Imports, 199,784 tons against 131,892 tons. Exports, 650,499 tons against 446,427 tons.

GERMAN COAL MINING STRUGGLE

Trouble About Working Hours—Iron Industry Largely Affected—Financial Crisis Acute

BERLIN, GERMANY, May 15.—Following negotiations between owners and men in the Ruhr coal industry, a new fight has broken out of far reaching consequences not only to coal mining, but to the position of all industries of this country and to the entire economic position of Germany. Miners' wages, which had been reduced up to 30 per cent at the beginning of this year, were, according to the finding of the arbitrator, to be increased by 15 per cent. The award also stipulated a continuation of the 8-hr. working day in the mine, and 10 hr. at the pithead, which had been worked according to agreement up to April 30. The men agreed to temporary overtime work at special overtime pay, but the owners declined to grant this concession and declare that without longer working hours they will not be in a position to fulfill the Micum agreements. The miners have left the pits after working 7 hr., whereupon more than 90 per cent have been locked out without notice. Almost the entire Ruhr coal industry has come to a standstill, and the Minister of Labor, Dr. Braun, is personally conducting negotiations between the parties, but judging by the antagonistic position taken up on both sides it may take some time before work is resumed.

Financial losses to the Ruhr coal industry due to the stoppage of work are estimated at 8 to 9 million gold marks per day. The government mines also have locked out the men who refused to work more than 7 hr. It is said that the railroads and the industries have accumulated considerable stocks, but the stoppage will soon make itself felt in all lines and, with a continuation, other industries, and especially the production of iron and steel, will soon be affected seriously. At the present juncture this development is nearly a catastrophe, which may have great political and economic consequence. At the Upper Silesian mines also the men are on strike, and in the coal industry of Saxony the men have been locked out for the same reason as in the Ruhr district.

Shutting Down Furnaces

Stoppage in the supply of fuel already is creating difficulties in the iron and steel industry. The Bochumer Verein will have to close its works in the course of the next week unless coal production is restarted during the next few days. Its pig iron production already is reduced to less than 25 per cent. The large Hösch steel

works in Dortmund have been closed. The Dortmunder Union had to blow out two blast furnaces and the engineering works in the district are announcing short time work and the granting of holidays for next week. The Gelsenkirchener Bergwerks Gesellschaft has blown out three blast furnaces and the Gute-Hoffnungshütte has only one blast furnace out of five under fire, and 1800 of its workmen have either been granted leave of absence or been dismissed. Krupp is also working short time in some factories. The Rheinische Stahlwerke, the Phoenix Co. and the Friedrich Alfred Hütte have had to slow down production at the blast furnaces.

On account of the lack of coke and the scarcity of ready capital and credit, the Ilseder Hütte (iron works) and the Peiner Walzwerk (rolling mills) also are reducing production. The Peine rolling mill is working short time in a number of factories and the former has dismissed a number of men and is working only three days per week in the blast furnace works. Four furnaces have been blown out and the staff also is to be reduced by 30 per cent until the end of July. Prior to the present differences in the mining industry, about a fortnight ago, the number of men employed in the Ruhr metal industry totaled 68 per cent of the 1922 figure. Fifty-five blast furnaces and 153 open-hearth furnaces are under fire. Pig iron and steel production is about 91 per cent of that of 1922.

Working Capital Scarce

The financial crisis through which Germany is passing at present is constantly increasing. Financial experts differ in regard to the near future. Some hold that the peak of the crisis has been reached, while others are of the opinion that it is only in its first stage. A considerable number of smaller firms, among the many banking undertakings that were established during the time of the inflation of the German currency, have had to declare their insolvency, but even larger, well-known firms now are getting into difficulties and it is almost impossible to predict the development during the next few weeks. The general scarcity of funds is the reason for the difficulties.

This is in the first instance due to the huge amounts of goods sold abroad during the time of the inflation, at a low gold price, a practice which has been sapping the financial strength of this country. At present the unsettled conditions of the country make it exceedingly difficult to obtain foreign credits and the Reichsbank is greatly restricting credit operations. Conditions in this respect are especially accentuated in the occupied area, where, owing to the greater risks involved, the interest to be paid is higher. The great struggle in the mining industry also is making matters in this respect considerably worse. A large improvement is expected from the conclusion of credit agreements with foreign financiers after the acceptance of the Dawes agreement.

Effect on Steel Demand

After traders and consumers replenished their stocks orders for iron products have decreased slightly and constitute mostly current requirements. Most of the works are, however, still sufficiently employed for some time. Internal conditions, especially the differences in the mining industry and the development of the financial crisis, will greatly influence the situation in the iron industry during the next few weeks. Trade in rolled material continues brisk. There is a large demand for small rails, bar iron and structural shapes. Some export orders for structural shapes also have been secured. Heavy and medium sheets are weak, while fine plates and wire are in great demand. In wires many foreign orders, especially for South America, South Africa and the East, have been booked.

Scrap Exports Curtailed

According to a new Government decision, 30 per cent of the scrap from dismantled ships may be exported and 70 per cent must be reserved for inland use to alleviate the scarcity of scrap at home. The firms that import old ships and dismantle them have, however, petitioned the government asking for the continuation of the old status, under which 75 per cent of the scrap could be exported and 25 per cent was to be sold in the home market.

They declare it impossible to sell 70 per cent in the German market at world prices, home prices being much lower, and the foreign banks which had largely financed their business would cease to do so in the future, as no guarantee could be given that the necessary foreign exchange for the purchase of old ships abroad could be procured in this way. The German Gold Loan Bank also has declared that it could give credits only to the extent for which there was a security that foreign exchange could be realized by the sales of scrap.

The German firm of Rawack & Grünfeld, which already imported Russian ore into Germany before the war, has concluded a new contract with the South Russian Ore Trust. The amounts in question, which include manganese and iron ore, are not very large, as a permanent agreement is to be made later on, if the present arrangement works to satisfaction. The unfortunate incident of German police interference, which occurred at the Berlin office of the Russian Foreign Trade Committee and which already has led to the interruption of numerous Russo-German business connections, may also influence the ore contract adversely.

Copper Gets Special Consideration

The Mansfeld Co., the only copper producer in Germany, intended to close its works, as production had proved unprofitable. To prevent this, extensive negotiations between the directors, representatives of the government, of labor, and of the interested municipalities have been conducted and the government is deciding on the following scheme: The company is to receive special treatment in regard to freightage of its coke supply; the 2 per cent tax on turnover of the first product is abandoned, and the government gives the company a credit of 1,500,000 marks at 8 per cent per annum. Negotiations for the establishment of a new association in the metal industry, which is to include all firms in the nonferrous metal industries from the producers of raw material to the manufacturers of finished articles, are being conducted.

JAPAN AWAITS NEW CABINET

Action on Reconstruction Expected Soon—Sheet Supply Good for Ten Months

NEW YORK, June 3.—Export to the Far East continues quiet. It is said in some quarters that stocks of black sheets in Japan are sufficiently large to satisfy the requirements of 10 months' consumption. A large percentage is believed to be of British origin, in view of the light buying of black sheets in the United States in recent months. Japanese producers of telegraph wire seem to be on a competitive basis, judging by the award of 220 tons of galvanized telegraph wire to the Nippon Telegraph Wire Co. by the Imperial Government Railways. Of plain wire included in the same tender 170 tons is said to have been placed with Suzuki & Co. and filled from stock in Japan. A previous order for telegraph wire was placed about a fortnight ago with the Inui Telegraph Wire Co.

Progress in reconstruction work is to a certain extent dependent upon formation of a new cabinet, the present administration having been defeated in the recent election. Action has been delayed, however, because of the marriage of Prince Regent Hirohito May 31. At a meeting June 2 the Kiyoura cabinet decided to tender its resignation to the Prince Regent on June 6, according to cabled information to Japanese officials in the United States.

Importers of European material continue to offer various products at slightly less than the current market, but in view of the domestic price situation but little interest is aroused among potential buyers. It is reported that the Pont-a-Mousson works, which has sold cast iron pipe to American consumers near seaboard, contemplates establishing a representative in New York. Importers with connections in European steel centers claim that offers of German material seized during the French occupation of the Ruhr are spurious, as there is little or none of this material available.

MAY IRON OUTPUT

Decrease from April Was 23,423 Tons
Per Day

Net Loss of 46 Furnaces, with 52 Shut Down and
6 Blown in

The curtailment in the pig iron production of the country, which was sharp in April, was almost precipitous in May. The net loss in operating furnaces was 46 added to the net loss of 40 in April. The decline in daily output was 23,423 tons, a loss for which it is difficult to find a parallel. The daily rate in May of 84,358 tons is less than any month in 1923 and is just below the daily output in October, 1922.

Production of coke and anthracite pig iron for the 31 days of May amounted to 2,615,110 gross tons or 84,358 tons per day as compared with 3,233,428 tons or 107,781 tons per day for the 30 days in April. This is a loss of 23,423 tons per day, or the lowest production rate since September, 1922, and compares with a loss in April of 4028 tons per day. There were 52 furnaces blown out or banked and 6 blown in or a net loss of 46. Of the 52 furnaces shut down 43 were steel making and 9 were merchant.

The capacity of the 184 furnaces in blast on June 1 is estimated at 77,300 tons per day as compared with 96,365 tons per day for the 230 furnaces in blast on May 1.

Ferromanganese output in May was 14,993 tons, with the spiegeleisen production 9336 tons.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from May, 1923, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
May, 1923	96,029	28,735	124,764
June	90,907	31,641	122,548
July	88,798	29,858	118,656
August	86,479	24,795	111,274
September	78,799	25,385	104,184
October	77,255	24,331	101,586
November	72,352	24,124	96,476
December	69,921	24,304	94,225
January, 1924	73,368	24,016	97,384
February	83,126	22,900	106,026
March	86,276	25,533	111,809
April	82,101	25,680	107,781
May	62,176	22,182	84,358

The figures for daily average production, beginning with January, 1918, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1918—Gross Tons

	1918	1919*	1920	1921	1922	1923	1924
Jan. 77,799	106,525	97,264	77,945	53,063	104,181	97,384	
Feb. 82,835	105,006	102,720	69,187	58,214	106,935	106,026	
Mar. 103,648	99,685	108,900	51,468	65,675	113,673	111,809	
Apr. 109,607	82,607	91,327	39,768	69,070	118,324	107,781	
May 111,175	68,002	96,312	39,394	74,409	124,764	84,358	
June 110,793	70,495	101,451	35,494	78,701	122,548		
July 110,354	78,340	98,931	27,889	77,592	118,656		
Aug. 109,341	88,496	101,529	30,780	58,586	111,274		
Sept. 113,942	82,932	104,310	32,850	67,791	104,184		
Oct. 112,482	60,115	106,212	40,215	85,092	101,586		
Nov. 111,802	79,745	97,830	47,183	94,990	96,476		
Dec. 110,762	84,944	87,222	53,196	99,577	94,225		
Year 105,496	83,789	99,492	45,325	73,645	109,713		

Among the furnaces blown in during May were the following: No. 2 Farrell furnace of the Carnegie Steel Co. in the Shenango Valley; No. 3 Ohio furnace of the Carnegie Steel Co. in Mahoning Valley; No. 3 furnace of the National Tube Co. in northern Ohio; one furnace of the Colorado Fuel & Iron Co., in Colorado; the new furnace of the Columbia Steel Corporation at Ironton, Utah, and No. 5 Hattie Ensley furnace of the Sloss-Sheffield Steel & Iron Co. in Alabama.

Among the furnaces blown out or banked during May were the following: Harriet furnace and one Susquehanna furnace (June 1) in the Buffalo district; E furnace of the Bethlehem Steel Corporation in the Lehigh Valley; one furnace at the Steelton plant of the Bethlehem Steel

Corporation in the lower Susquehanna Valley; one Donora and one Shoenberger furnace of the American Steel & Wire Co., one Clairton, three Duquesne and four Edgar Thomson furnaces of the Carnegie Steel Co. in the Pittsburgh district; two Newcastle and two Farrell furnaces, as well as No. 3 Shenango and the Stewart furnace in the Shenango Valley; the Emporium, Punxy and Colonial furnaces and one Johnstown furnace at the Cambria plant of the Bethlehem Steel Corporation in western Pennsylvania; the Crozer furnace of the Virginia Iron, Coal & Coke Co. in Virginia; one furnace of the Bethlehem Steel Corporation in Maryland; one Steubenville furnace of the Wheeling Steel & Iron Corporation and two furnaces of the Carnegie Steel Co. in the Wheeling district; three Youngstown and the Grace furnace of the Youngstown Sheet & Tube Co., four Ohio furnaces of the Carnegie Steel Co., one Haselton furnace of the Republic Iron & Steel Co. and the Trumbull-Cliffs furnace in the Mahoning Valley; one Central furnace of the American Steel & Wire Co. and No. 2 furnace of the National Tube Co. in northern Ohio; the Portsmouth and one Marting furnace in southern Ohio, four Gary furnaces, the Federal furnace and a Joliet and South Chicago furnace of the Illinois Steel Co. in the Chicago district; one furnace of the Colorado Fuel & Iron Co. in Colorado and No. 2 furnace of the Minnesota Steel Co. in Minnesota.

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for May and the three months preceding.

Pig Iron Production by Districts, Gross Tons

	May (31 days)	April (30 days)	March (31 days)	Feb. (29 days)
New York	151,649	203,920	242,003	214,909
New Jersey .....	.....	12,545	13,006	13,730
Lehigh Valley	79,843	83,969	97,817	87,583
Schuylkill Valley	63,578	64,558	61,346	59,020
Lower Susquehanna and Lebanon Val- leys	44,825	63,448	68,863	60,478
Pittsburgh district	541,295	657,479	716,106	638,462
Shenango Valley	86,777	131,987	134,925	106,377
Western Pa.	97,951	138,455	158,142	145,984
Maryland, Virginia and Kentucky	56,653	77,247	88,631	67,733
Wheeling district	123,689	152,843	158,825	136,719
Mahoning Valley	190,104	326,091	373,410	330,420
Central and North- ern Ohio	301,187	308,615	294,624	270,207
Southern Ohio	43,624	50,874	56,001	47,824
Illinois and Indiana	440,790	586,722	629,381	541,649
Mich., Minn., Mo. Wis., Colo. and Utah	132,169	126,765	127,788	125,227
Alabama	249,268	230,548	231,817	219,358
Tennessee	11,708	17,362	11,801	9,077
Total	2,615,110	3,233,428	3,466,086	3,074,757

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the foregoing totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production		Spiegeleisen and Ferromanganese			
	1923	1924	1923		1924	
	Fe-Mn	Spiegel	Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan. ...	2,479,727	2,274,005	19,358	12,056	20,735	7,948
Feb. ...	2,259,154	2,410,658	21,282	3,657	22,405	9,870
Mar. ...	2,724,305	2,674,565	20,730	13,832	22,351	13,796
Apr. ...	2,704,360	2,463,027	20,808	7,440	23,580	4,240
May ...	2,976,892	1,927,461	19,568	9,533	14,993	9,336
June ...	2,727,208	.....	19,717	18,289	.....	.....
½ year ..	15,871,646	.....	121,564	64,807	.....	.....
July ...	2,752,738	.....	26,493	12,876	.....	.....
Aug. ...	2,680,851	.....	22,045	5,586	.....	.....
Sept. ...	2,363,967	.....	23,206	4,478	.....	.....
Oct. ...	2,394,922	.....	20,015	15,931	.....	.....
Nov. ...	2,170,567	.....	14,839	16,783	.....	.....
Dec. ...	2,167,563	.....	18,069	10,124	.....	.....
Year ..	30,402,254	.....	246,231	130,585	.....	.....

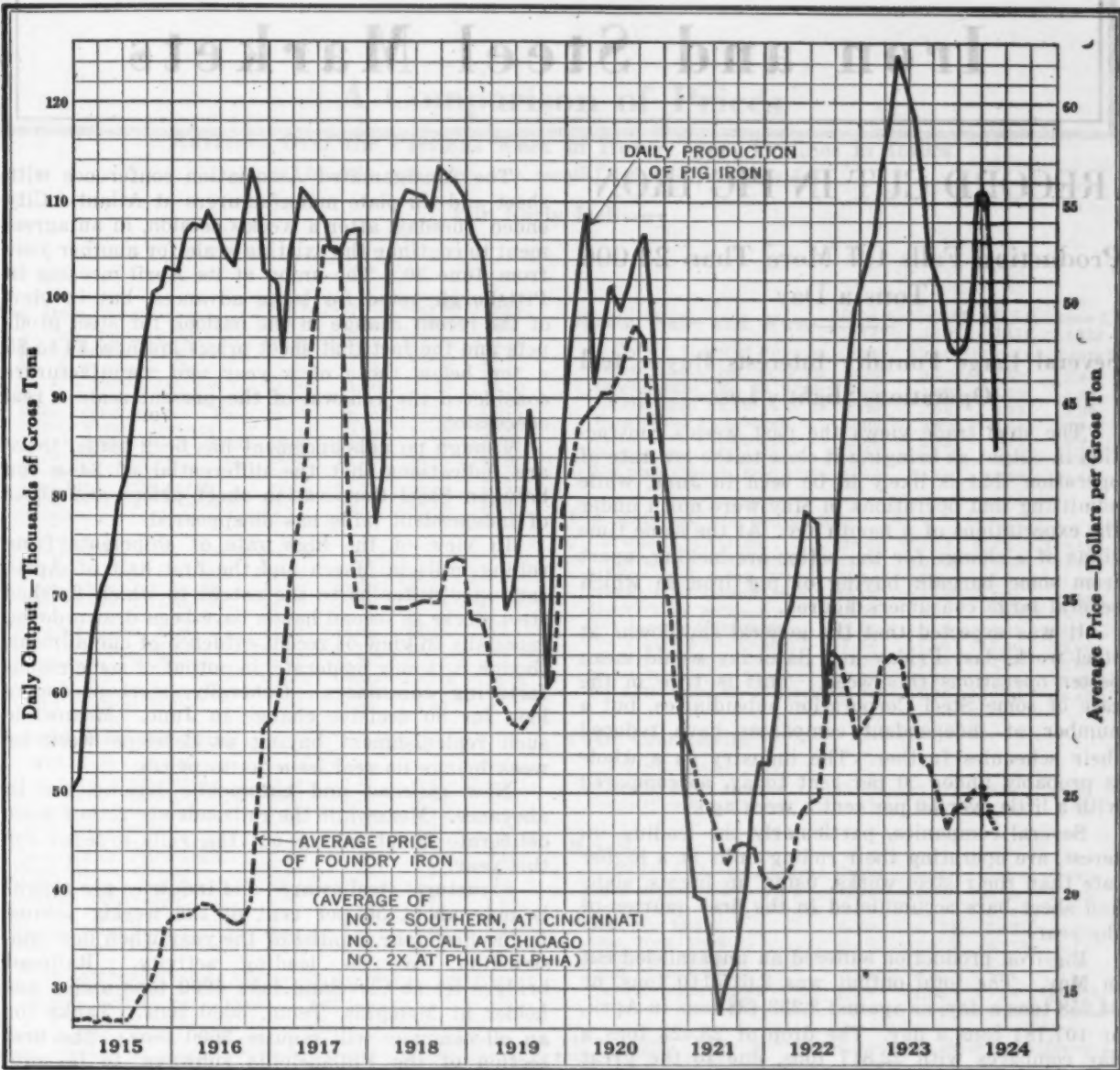


Diagram of Pig Iron Production and Price

Production and Price Chart

The fluctuations in pig iron production from 1915 to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of the daily average production, by months, of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1920—Gross Tons

	1920	1921	1922	1923	1924
Jan. . . .	3,015,181	2,416,292	1,644,951	3,229,604	3,018,890
Feb. . . .	2,978,879	1,937,257	1,629,991	2,994,187	3,074,757
Mar. . . .	3,375,907	1,595,522	2,035,920	3,523,868	3,466,086
Apr. . . .	2,739,797	1,193,041	2,072,114	3,549,736	3,233,428
May	2,985,682	1,221,221	2,306,679	3,867,694	.....
June	3,043,540	1,064,833	2,361,028	3,676,445	.....
½ year . .	18,138,986	9,428,166	12,050,683	20,841,534	.....
July	3,067,043	864,555	2,405,365	3,678,334	.....
Aug. . . .	3,147,402	954,193	1,816,170	3,449,493	.....
Sept. . . .	3,129,323	985,529	2,033,720	3,125,512	.....
Oct. . . .	3,292,597	1,246,676	2,637,844	3,149,158	.....
Nov. . . .	2,934,908	1,415,481	2,849,703	2,894,295	.....
Dec. . . .	2,703,855	1,649,086	3,086,898	2,920,982	.....
Year* . .	36,414,114	16,543,686	26,880,383	40,059,308	.....

*These totals do not include charcoal pig iron. The 1923 production of this iron was 251,177 tons.

Boiler Makers Study Waste Elimination

Manufacturers of return tubular boilers, meeting in Chicago last week took initial steps toward greater standardization of their products and to secure the aid of the Division of Simplified Practice, Department of Commerce in elimination of waste in their industry.

Fifteen points which had been indicated as those in which the present diversity is excessive were presented. After a discussion of these they were referred to a committee comprising: James A. McKeown of the John O'Brien Boiler Works Co., St. Louis; George W. Bach of the Union Iron Works, and Frank G. Brinig of the Erie City Iron Works, both of Erie, Pa.; S. H. Daniels of the Walsh & Weidner Boiler Co. of Chattanooga, Tenn.; W. A. Drake of the Brownell Co., Dayton, Ohio.; Joseph J. Doyle, Ames Iron Works of Oswego, N. Y., and C. V. Kellogg, Kellogg-MacKay Co., Chicago. This committee was instructed to draw up tentative "simplified practice recommendations" to be submitted to the American Boiler Manufacturing Association at its convention in Hot Springs, Va., on June 9-11.

The number of tractors in Turkey is estimated to be about 300, and most of these have been imported during the past three years. During 1921 only one tractor was imported at Constantinople, but in 1922, 127 tractors were imported and 150 in 1923. About two-thirds of the tractors in Turkey are of American make, Consul General Ravndal reports, and principally of the wheel type.

Iron and Steel Markets

RECORD CUT IN PIG IRON

**Production Falls Off More Than 23,000
Tons a Day**

**Several Large Foundry Interests Buy—Steel
Operations Slightly Less**

The steel trade views the past week's contraction in output as bringing it close to the low rate of operation that is likely to be seen in June, while admitting that operations in May were much under the expectations of a month ago. At the same time signs of a change for the better are lacking, apart from some bargain buying of pig iron in which several large consumers figured.

It was expected that the general shutdowns at steel works last Friday and Saturday would mean better operations this week. This is true in the case of some Steel Corporation subsidiaries, but a number of independent companies have reduced their schedules further. The industry as a whole is probably under 50 per cent today, as compared with a little over 50 per cent a week ago.

Several companies, particularly the leading interest, are operating their rolling mills at a higher rate than their steel works, using up ingots, slabs and sheet bars accumulated in the first quarter of the year.

Pig-iron production suffered an unparalleled cut in May. The total output was 2,615,110 tons, or 84,358 tons a day, as against 3,233,428 tons in April, or 107,781 tons a day. The drop of 23,423 tons a day compares with 22,817 tons, due to the great steel strike in October, 1919, and with 21,123 tons in December, 1907, following the panic in November of that year.

There was a net loss of 46 blast furnaces last month, following a loss of 40 in April, whereas January, February and March had shown a total gain of 39. The 184 furnaces in blast June 1 had an estimated capacity of 77,300 tons a day, as against 96,365 tons a day for the 230 furnaces active at the beginning of May.

There are plans for putting out several additional furnaces early this month in view of the large stocks of iron on hand, particularly in the Central West.

The net loss of Steel Corporation blast furnaces in May was 25, of independent companies 12, and of merchant furnace companies 9. The Carnegie Steel Co. now has but 27 of its 58 furnaces in production, the smallest number since the mid-summer depression of 1921.

The volume of pig iron buying shows a decided increase, due largely to the purchase this week of about 50,000 tons by a radiator company and 20,000 tons by a cast iron pipe company, with sales and inquiries for smaller tonnages fairly numerous. The price situation, however, is still weak, with a decline of 50c. at Pittsburgh and Chicago and low prices at Buffalo and in eastern Pennsylvania. Reports of aggressiveness of one or two steel companies in selling merchant pig iron have been disconcerting to merchant producers.

The Amalgamated Association conference with sheet and tin plate manufacturers at Atlantic City ended Tuesday, after a week's session, in an agreement to continue the existing scale for another year from June 30. The union at its April meeting in Pittsburgh voted for large advances, but in view of the recent change in the outlook for steel products and the fact that sheet prices are now \$4 to \$5 a ton below those of a year ago manufacturers considered the renewal of the present scale a real concession.

Though no announcement has been made, there are indications that the differential of \$4 a ton between Steel Corporation sheet prices and those of independent mills has disappeared.

In view of the high rate of shipments from rolling mills in March and the first half of April, estimates differ as to the extent to which finished steel stocks in second hands have been drawn down, especially in view of recent evidence of curtailment, though it is only moderate, in output of some manufacturing consumers. Generally, steel producers look for no decisive change in June. Meanwhile such replenishment buying as develops week by week brings no real issue as to prices.

New railroad and automobile buying are in abeyance. Meanwhile the railroads are rather more deliberate about taking out the rails ordered for this year.

Structural steel awards and inquiries are roughly only about 50 per cent of the weekly volume in the first four months of the year when new construction was the leading activity. Railroad bridges let at Cleveland take 4000 tons and a gas holder at Memphis, Tenn., 3000 tons. Tanks for an oil company will require 3600 tons. The first section of the Philadelphia subways, to be submitted for bids in a week or so, will call for 9300 tons of fabricated steel.

Another decline in foundry iron carries THE IRON AGE pig iron composite price down to \$20.86, from \$20.98 last week. The gradual drop, over three months, has aggregated \$2 a ton. The price is now \$8 below that of a year ago.

No change has occurred in finished steel, THE IRON AGE composite price remaining at 2.624c. per lb. This results from a gradual decline, spread over four months, and now amounting to \$3 a net ton.

Pittsburgh

**Steel Prices Steadier—Pig Iron Quotations
Decline 50 Cents**

PITTSBURGH, June 3.—Again the report about steel business is one of no appreciable gain in orders and a further decrease in production. As closely as it can be estimated, the steel industry in this and nearby districts is producing ingots at between 40 and 45 per cent of capacity, pig iron at about 50 per cent of capacity and finishing mills, taking in all classes, are about 55 per cent engaged. The situation might be compared to an automobile with the engine in neutral. The common expectation is that this month will see no real improvement in business, for, while there has been a pretty complete liquidation of consumers' stocks, it is doubtful whether there will be any departure from a hand-to-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	June 3, 1924	May 27, 1924	May 6, 1924	June 5, 1923
No. 2X, Philadelphia...	\$22.13	\$22.40	\$22.76	\$30.76
No. 2, Valley Furnace...	20.00	20.50	21.00	29.00
No. 2, Southern, Cin'ti...	25.05	25.05	26.05	29.55
No. 2, Birmingham, Ala.†	21.00	21.00	22.00	25.50
No. 2 foundry, Chicago*	22.00	22.50	23.00	32.00
Basic, del'd, eastern Pa.	21.00	21.00	21.00	28.14
Basic, Valley furnace...	20.00	20.00	21.00	27.50
Valley Bessemer del. P'gh.	23.26	23.76	24.26	30.77
Malleable, Chicago*	22.00	22.50	23.00	32.00
Malleable, Valley	20.00	20.50	21.50	29.00
Gray forge, Pittsburgh...	21.26	21.76	22.26	30.27
L. S. charcoal, Chicago...	29.15	29.15	29.15	36.65
Ferromanganese, furnace...	107.50	107.50	107.50	130.00

Rails, Billets, Etc., Per Gross Ton:	June 3, 1924	May 27, 1924	May 6, 1924	June 5, 1923
O.-h. rails, heavy, at mill...	\$43.00	\$43.00	\$43.00	\$43.00
Bess. billets, Pittsburgh...	38.00	38.00	40.00	43.00
O.-h. billets, Pittsburgh...	38.00	38.00	40.00	45.00
O.-h. sheet bars, P'gh...	40.00	40.00	41.00	45.00
Forging billets, base, P'gh.	43.00	43.00	45.00	55.00
O.-h. billets, Phila...	43.17	43.17	43.17	50.17
Wire rods, Pittsburgh...	48.00	48.00	51.00	51.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb...	2.20	2.20	2.25	2.45
Light rails at mill...	1.90	1.90	2.00	2.25

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.42	2.47	2.52	2.72
Iron bars, Chicago...	2.25	2.25	2.30	2.60
Steel bars, Pittsburgh...	2.20	2.20	2.25	2.40
Steel bars, Chicago...	2.25	2.25	2.35	2.60
Steel bars, New York...	2.54	2.59	2.59	2.74
Tank plates, Pittsburgh...	2.20	2.20	2.20	2.50
Tank plates, Chicago...	2.40	2.40	2.45	2.80
Tank plates, New York...	2.34	2.34	2.49	2.84
Beams, Pittsburgh...	2.20	2.20	2.25	2.50
Beams, Chicago...	2.45	2.45	2.45	2.70
Beams, New York...	2.44	2.44	2.59	2.84
Steel hoops, Pittsburgh...	2.75	2.75	2.75	3.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	June 3, 1924	May 27, 1924	May 6, 1924	June 5, 1923
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.60	3.60	3.60	3.85
Sheets, galv., No. 28, P'gh.	4.80	4.80	4.80	5.00
Sheets, blue an'd, 9 & 10	2.80	2.80	2.80	3.00
Wire nails, Pittsburgh...	2.90	2.90	3.00	3.00
Plain wire, Pittsburgh...	2.65	2.65	2.75	2.75
Barbed wire, galv., P'gh...	3.70	3.70	3.80	3.80
Tin plate, 100-lb. box, P'gh.	\$5.50	\$5.50	\$5.50	\$5.50

Old Material, Per Gross Ton:

Carwheels, Chicago...	\$16.00	\$16.50	\$16.00	\$22.50
Carwheels, Philadelphia...	17.00	17.00	17.00	23.00
Heavy steel scrap, P'gh...	15.50	15.50	15.50	21.50
Heavy steel scrap, Phila...	15.00	15.00	15.00	18.00
Heavy steel scrap, Ch'go...	13.75	13.75	13.50	18.50
No. 1 cast, Pittsburgh...	17.50	17.50	18.00	25.00
No. 1 cast, Philadelphia...	17.50	17.00	17.00	23.00
No. 1 cast, Ch'go (net ton)	17.00	17.00	17.50	22.00
No. 1 RR. wrot. Phila...	16.50	16.50	17.00	23.00
No. 1 RR. wrot. Ch'go (Net)	11.75	11.75	12.00	16.00

Coke, Connellsville,

Per Net/Ton at Oven:

Furnace coke, prompt...	\$3.25	\$3.25	\$3.25	\$4.75
Foundry coke, prompt...	4.50	4.50	4.75	5.75

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	12.87½	13.00	13.50	15.25
Electrolytic copper, refinery	12.50	12.50	13.12½	14.75
Zinc, St. Louis...	6.80	5.72½	5.82½	6.40
Zinc, New York...	6.15	6.07½	6.17½	6.75
Lead, St. Louis...	6.95	6.65	7.50	7.05
Lead, New York...	7.00	7.00	7.75	7.30
Tin (Straight), New York	40.75	41.50	47.50	41.87½
Antimony (Asiatic), N. Y.	8.50	8.50	9.75	7.00

Composite Price, June 3, 1924, Finished Steel, 2.624c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	May 27, 1924, 2.624c. May 6, 1924, 2.653c. June 5, 1923, 2.789c. 10-year pre-war average, 1.689c.
These products constitute 88 per cent of the United States output of finished steel	

Composite Price, June 3, 1924, Pig Iron, \$20.86 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	May 27, 1924, \$20.98 May 6, 1924, 21.79 June 5, 1923, 28.46 10-year pre-war average, 15.72
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mouth buying policy until after the national conventions of the leading political parties.

The price situation generally is steadier. Some uncertainty still exists with regard to prices of plates, shapes and bars, but in practically all other finished lines producers appear less inclined to seek trading levels than was the case recently, presumably because of a realization that the demand is not there even at below present levels. While there are stray reports that some buyers have allowed their stocks to fall below what is regarded as the danger line and that these interests only wait upon positive evidence that prices have struck bottom for buying, there is no disposition on their part to find out for themselves whether prices are as low as they are going. In a broad sense, the

present price structure is untested. Curtailment of production from the peak point of last March has been both rapid and steep until today reports are beginning to come out that production in some lines is actually falling behind incoming business, even though the latter is small. There is no doubt that there was rather serious miscalculation of the spring and summer requirements of steel which resulted in overproduction, but the industry has been so quick to start corrective measures that it is believed there is no longer a very wide gap between supply and demand. With this, taken in connection with the fact that manufacturers rather than consumers have the stocks, it is not hard to imagine a firmer price situation.

Slightly lower prices have appeared in most grades

of pig iron, but there has been such a big recession in production from the past month that the trade is inclined to the notion that the new prices represent levels from which further material declines are unlikely. As noted elsewhere in these columns in detail, more than half of the furnaces in this and nearby districts now are out of production and this condition, it is believed, will soon be reflected in available supplies.

The scrap situation is without important change and conditions in the coke market are much as they have been for the past few weeks.

So far the only wage reductions are those that have been made in the Connellsville district. There are no intimations that steel plant labor will have to take a reduction in the near future and the outcome of the wage conference at Atlantic City is that present scales for sheet and tin plate workers will continue for another year.

Pig Iron.—Actual business still is of very small compass in this market, but there is a feeling that larger purchases are not far off, since most melters are getting to the end of their stocks. One merchant furnace interest has been entering protections to regular customers and one deal of this sort involves 2000 tons of foundry iron for third quarter delivery at trade paper average prices. Generally the sales of foundry iron for early delivery have been of small lots and at prices ranging from \$20 to \$21, Valley furnace for No. 2 grade. The lower price represents a recession of 50c. a ton from last week's minimum. Malleable iron also is available as low as \$20, Valley furnace, which also is a decline of 50c. a ton. We note one sale of 200 tons of standard Bessemer iron at \$21.50 Valley furnace and a Youngstown consumer bought a similar tonnage which is believed to have gone at the same price. These transactions have served to establish that grade at \$21.50, which compares with \$22, the recent price. There has not been enough demand for basic iron to develop any change from the recent base of \$20 Valley, or Johnstown. Valley producers are understood to have quoted \$20 for the base grade against the Westinghouse Electric & Mfg. Co. inquiry for its Cleveland plant, which included 1150 tons of No. 2 X, 500 tons of No. 2 and 1400 tons of No. 3. It is probable that this business will go to Cleveland furnaces at a furnace base of \$21 or a delivered price of \$21.50. W. P. Snyder & Co. make the average price of Bessemer iron from Valley furnaces in May, \$22.125 against \$22.80 in April and the average price of basic \$20.32 against \$21.50 in April.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.76 per gross ton:

Basic	\$20.00
Bessemer	21.50
Gray forge	\$19.50 to 20.00
No. 2 foundry	20.00 to 21.00
No. 3 foundry	19.50 to 20.00
Malleable	20.00 to 20.50
Low phosphorus, copper free....	29.00

Ferroalloys.—Business remains exceedingly slack and prices show no particular change, except that spiegeleisen can be bought about \$1 a ton below recent prices. Generally, there is so little interest in the market on the part of consumers that there is no way of determining whether lower prices would bring out business. There are reports of cheaper offerings of ferro-manganese in the West, but these are believed to refer to Indian material, running lower in manganese content than British or domestic alloy. On the latter the price still is \$107.50, Atlantic seaboard. Prices are given on page 1687.

Semi-Finished Steel.—There is not enough open market business to definitely determine just where prices are. Contracts have been revised to \$38, Pittsburgh or Youngstown for billets and slabs and to \$40 for sheet bars, but there is much doubt that some user seeking a tonnage today would have to pay those prices. It is believed that \$38 would be highly interesting to some makers of sheet bars, but this is largely conjecture, since none of the sheet or tin plate mills is

sufficiently interested in supplies to make a bid. The market is easy at quotations on these forms and the statement is equally true of skelp and rods. Not much shopping would be necessary to uncover a lower price than is publicly quoted on skelp and \$48, base, is the prevailing price on rods, despite asking prices of more by some makers. Indeed, there are reports of sales at \$47.50, which are partly confirmed by the fact that business has been lost at \$48. Ingot production still is slipping in this and nearby districts and now is hardly half what it was in early March, when a general average of 90 per cent of capacity was attained. Prices are given on page 1687.

Wire Products.—Buyers still are unimpressed by the reduction in prices of about three weeks ago and continue to pursue a strictly hand-to-mouth buying policy. While there is a pretty general tendency among mills in this and nearby districts to hold to \$2.90, base, per keg for nails and \$2.65, base, per 100 lb. for plain wire, buyers are not convinced that prices yet have struck bottom and in that notion find some support in reports that \$2.85, base, has been done on nails by some of the smaller outside mills. Wire plant operations are down to about 40 per cent of capacity for an average, but mill stocks are sufficiently large to permit quick shipments against current demands. That condition is not conducive to active forward buying. Prices are given on page 1686.

Steel Rails.—The light rail market still is easy, because demand is not sufficient to give all makers something to do and competition for passing orders is rather sharp. Billet rails still are priced at 1.90c. to 2c., base, mill, but as low as 1.75c., base, is heard on rail steel rails, and in one case 1.65c. is reported by a mill to overcome a freight advantage of competing companies. Orders rarely exceed a carload and most of them are for smaller quantities.

We quote light rails, rolled from billets, 1.90c. to 2c. base (25-lb. to 45-lb.); rolled from rail steel, 1.75c. to 1.85c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, \$43 per gross ton mill, for Bessemer and open-hearth sections.

Tubular Goods.—The leading interest seems to be faring somewhat better in the matter of current business, aside from its consigned accounts business, and is enjoying a higher rate of operations. The general average of pipe mill operations is right around 70 per cent of capacity, but the leading interest is doing at least 15 per cent above that rate. Secondary weakness in prices of standard pipe does not seem to be extending to mill prices, despite a good many demands for help from jobbers who are finding the competition severe. Most jobbers are carrying larger stocks than they expected they would have at this season, due to their own big purchases in the first place and in the second place because consumptive demand has been below expectations. They are now liquidating instead of building up stocks, presumably on the basis that pipe cannot hold up in the face of the declines that have already taken place in other products. Oil well pipe business could be better than it is, but is regarded as satisfactory in view of the fact that the weather has permitted so little use of automobiles this spring that gasoline stocks have increased instead of declining as it was expected they would. Better weather is counted on to correct this situation and to stimulate drilling operations. Boiler tubes are as weak as ever, in the effort of all producers to get a share of business that is not sufficient to provide engagement for half of the country's capacity. Actual selling prices of tubes have only a remote relation to card discounts. Discounts are given on page 1686.

Sheets.—Some makers, notably the American Sheet & Tin Plate Co., are getting some releases against protections and a few more orders than recently, but the market by and large is no more active than it has been and mill operations are at a lower notch than at any time since the business recession set in more than two months ago. We estimate this week's operations of the sheet industry as a whole at 45 per cent of capacity. Lack of activity prevents a real test of prices, but on the whole fewer mills than recently are cutting below

the more general independent level, which in turn is \$4 a ton below the last prices announced by the American Sheet & Tin Plate Co. Prices are given on page 1686.

Tin Plate.—Shipping instructions are somewhat better with one independent company in this district, but this is an exceptional case and so much material is piled up in mill warehouses on orders as to continue a menace to mill operations, especially as there is as yet little interest in third quarter requirements. Can companies want to see cans moving faster before they order out tin plate they have already contracted for and future requirements will be governed largely by the success they have in moving the containers already stocked. Despite the dullness there is no suggestion of a lower price than \$5.50 per base box, Pittsburgh, for standard cokes for domestic account.

Cold-Finished Steel Bars and Shafting.—Business is as nearly at a standstill as it could be and say there was any market at all. The automotive industry appears to have pretty well converted steel into automobiles, trucks and tractors, but does not seem to be converting the finished products into cash rapidly enough to be much interested in production or the requirements of production. Without that industry there is little business for makers of cold-finished bars. An appraisal of prices, which is all that is possible under the circumstances, is from 2.90c. to 3c., base. Ground shafting holds at 3.40c., base, f.o.b. mill, for carload lots or more.

Track Supplies.—Products under this heading are holding at former prices, but there is so little demand that a test of them is not provided. It is believed that lower prices would be made on spikes and tie plates on attractive inquiries. Prices are given on page 1686.

Iron and Steel Bars.—Activity still is lacking in steel bars as regards both orders and specifications. The principal users of steel bars are not operating over 50 per cent and their specifications against contracts are in keeping with that condition. There is no disposition on the part of makers to go below 2.20c., base Pittsburgh, and there are no inquiries of a size to tempt concessions. Iron bars are dull and prices subject to some shading. Prices are given on page 1686.

Structural Material.—Mills in this district are holding rather firmly to a minimum of 2.20c., Pittsburgh, but frankly state that that price is not obtainable outside of the area in which Pittsburgh has a freight advantage over outside centers. Structural interests here report a rather good inquiry, although projects under consideration in most instances involve small tonnages. Investors are slow to close, although prices are favorable and reasonably early delivery is promised by most shops. Plain material prices are given on page 1686.

Plates.—Common quotations of Pittsburgh and Youngstown mills still are 2.20c. to 2.25c., base Pittsburgh, but very little business is coming out in this district and lower prices have to be made in outside districts, and it is doubtful whether 2.15c. would be refused by Pittsburgh mills if that price would bring a fair sized order. Prices are given on page 1686.

Hot-Rolled Flats.—Business is no better than it has been, but it is no worse and producers are rather disposed to make a stand at present prices. While 2.50c., base Pittsburgh, still is appearing on wide strips, a number of makers have set up and are observing a minimum of 2.60c. on this kind of material. Prices are given on page 1686.

Cold-Rolled Strips.—This product is holding its own, regards both as demand and prices. Shipments are running about 50 per cent of capacity and for stock for other purposes than tubing, 4.50c., base Pittsburgh, is the prevailing price.

Bolts, Nuts and Rivets.—Prices of these lines still lack stability because there is not enough business to give all makers a share and competition for orders still is rather keen. Discounts and prices are given on page 1686.

Coke and Coal.—There is no more of a market for furnace coke this week than there has been for several weeks. The few blast furnaces now in production run-

ning on Connellsville coke are covered by contract and there is practically no outlet for spot tonnages except for other than blast furnace use. The spot market, such as it is, is quotable at \$3.25 per net ton at ovens. That price also was the basis for the last contract that has been made and existing contracts which contained a wage clause are being revised downward, in some cases to that level, in accordance with the recent wage reduction in the Connellsville district, which has been put into effect by practically all of the independent operators. Spot foundry coke holds at \$4.50 to \$5 per net ton at ovens. The coal market shows a slightly livelier tone, with some Lake and tidewater business now coming in. The increase in demand, however, has placed no strain upon the supply and prices show no change. Mine run steam coal holds at \$1.50 to \$1.75 per net ton at mine, coking coal \$1.75 to \$2 and gas coal \$2 to \$2.25. Better demand for lump gas coal has increased the supply of gas slack grade, which is now available at \$1.30 or about 10c. a ton below the recent level. Steam slack is quoted at \$1.25.

Old Material.—There is no reason to make material changes in prices from those of a week ago. Mill and foundry buying of the heavier descriptions of scrap still is almost nil, but price ideas of sellers are no weaker and in the lighter grades much firmness is noted, because production is small, and also because there is a good demand, not only in this district, but outside, especially at points having a lower freight rate from Detroit, the center of the bulk of the production, than to this district. It is expected that high prices will rule on the 41,000 tons of old material on which the Pennsylvania Railroad will open bids June 3, because dealers will want these offerings either to throw down or to ship against old and high-priced orders, many of which still exist. Dealer buying will prevent consumers from getting cheap railroad material.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel.....	\$15.50 to \$16.00
No. 1 cast, cupola size.....	17.50 to 18.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.....	17.00 to 17.50
Compressed sheet steel.....	13.50 to 14.00
Bundled sheets, sides and ends..	12.50 to 13.00
Railroad knuckles and couplers..	18.50 to 19.00
Railroad coil and leaf springs...	18.50 to 19.00
Low phosphorus blooms and billet ends.....	20.00 to 20.50
Low phosphorus plate and other material.....	19.00 to 19.50
Railroad malleable.....	15.00 to 15.50
Steel car axles.....	18.50 to 19.00
Cast iron wheels.....	16.00 to 16.50
Rolled steel wheels.....	19.00 to 19.50
Machine shop turnings.....	13.00 to 13.50
Sheet bar crops.....	16.00 to 16.50
Heavy steel axle turnings.....	14.50 to 15.00
Short shoveling turnings.....	13.00 to 13.50
Heavy breakable cast.....	15.50 to 16.00
Stove plate.....	13.50 to 14.00
Cast iron borings.....	14.00 to 14.50
No. 1 railroad wrought.....	13.50 to 14.00
No. 2 railroad wrought.....	15.50 to 16.00

Sharpsville Stack Resumes

YOUNGSTOWN, June 3.—The first increase in blast furnace operations in this district in a period of two months of steady decline occurred this week in the resumption of the merchant stack of the Sharpsville Furnace Co., in the Shenango Valley. This resumption increases the number of active blast furnaces in the district to 15 of 45.

A shipment of Danish plows and American tractors has just gone forward to Soviet Russia, via Libau, according to reports to the Department of Commerce from the Commercial Attache's office in Copenhagen, and consists of 100 plows and 150 tractors. This shipment is expected to be the beginning of an extensive Danish trade with Soviet Russia. The sum involved is 700,000 crowns (about \$119,000) which has been paid in cash by the Soviet Government through the Russian bank in Copenhagen.

Chicago

Present Conditions Compared with Those of Three Years Ago

CHICAGO, June 3.—Demand for finished steel remains at such a low ebb that prices, while still weak, show no definite change. There is no doubt that buyers are still following a waiting policy in the belief that prices may go even lower, but in the absence of a real test it is problematical what course the market will take. While it is probable that the volume of current buying is little, if any, heavier than during the depression of three years ago, the present situation differs materially from the one which obtained in that period. At that time, buyers were burdened with heavy stocks of high priced material; today their supplies on hand are low. When orders are again released, therefore, they should be in good volume, possibly beyond the present rate of production.

Output, of course, is on a reduced basis and the past week has seen a further shrinkage in this district. The banking of a furnace at Gary brings the number of active stacks down to 16 out of 34 steel works blast furnaces in this section. Steel mill operations range from 50 to 65 per cent. Among the primary materials, pig iron has declined 50c. a ton, and scrap and coke have again given ground.

Pig Iron.—Although prices have again declined 50c. a ton at local furnaces, sentiment has improved following the appearance of an inquiry for 16,000 tons from an Eastern manufacturer having Western plants. Inquiries from other melters, while still small, are somewhat more numerous. At the same time, stocks in melters' hands are very low, indicating that replenishment cannot be delayed much longer. While it is true that foundries as a rule have relatively little forward business on their books, it is nevertheless a fact that they continue to operate and operation means pig iron consumption. Melters are apt to describe their business as poor, but it would be more correct to say that business is timid. Ever since early in the year, castings buyers have been buying from hand to mouth with the result that at no time have foundries been able to look very far ahead. It is reasonable to believe that this policy would change if prices showed some signs of stability. It is possibly significant, therefore, that the market has now reached a low price level and that brokers are making efforts to buy large tonnages on speculation in the expectation of cashing in on a subsequent rebound. It is not to be assumed, however, that the market has yet shown indications of firmness. Competition, which has been keen, has been rendered even more sharp by the sale of iron by a steel works interest which rarely offers tonnage for general sale. A Milwaukee melter has closed for 500 tons of foundry iron. An Indiana user wants 150 to 200 tons of foundry. A local plant has purchased 100 tons of Southern foundry for barge and rail shipment at \$24.68 delivered. A Michigan melter is in the market for 100 tons of charcoal.

Quotations on Northern foundry, high phosphorus, malleable and basic irons are f.o.b. local furnaces and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or, when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago.....	\$29.15
Northern coke, No. 1, sil. 2.25 to 2.75.....	22.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25.....	22.00
Malleable, not over 2.25 sil.....	22.00
Basic.....	22.00
High phosphorus.....	22.00
Southern No. 2.....	27.01
Southern No. 2 (barge and rail).....	24.68
Low phos., sil. 1 to 2 per cent, copper free.....	30.50
Silvery, sil. 8 per cent.....	35.29
Electric ferrosilicon, 14 to 16 per cent.....	45.42

Plates.—The Humble Oil Co. has placed five 80,000 bbl. oil storage tanks for a Texas location with the Chicago Bridge & Iron Works. The steel amounting to 1,600 tons will be rolled by the leading interest. The Ann Arbor Railroad has ordered a car ferry, requiring 500 tons, from the Manitowoc Shipbuilding Co.,

and award is now awaiting confirmation by the Interstate Commerce Commission. Prospective tonnage likely to be placed shortly, includes 3,600 tons for additional tanks for the Standard Oil Co. of Louisiana. On the whole, mill bookings in plates are still far from satisfactory and the price situation remains weak. In this immediate territory the lowest figure reported is 2,35c., Chicago, but in sections intermediate between this city and other producing centers, \$2 less has been done.

The mill quotation is 2.40c. to 2.45c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Ferroalloys.—No interest is manifested in the ferroalloys.

We quote 80 per cent ferromanganese, \$115.06; delivered; 50 per cent ferrosilicon, \$75, delivered; spiegeleisen, 18 to 22 per cent, \$42.56 to \$43.56, delivered.

Structural Material.—Structural awards for the week were more numerous, involving a total of 3,900 tons, of which 1,600 tons was accounted for by a single letting of oil storage tanks. The amount of new prospective business is particularly encouraging, totaling more than 8,000 tons exclusive of 3,600 tons involved in an oil tank inquiry. Among pending projects of long standing, the Jewelers' building, Chicago, involving 10,000 tons, is again active. Locally the financing of new construction work is becoming increasingly difficult, but it is interesting to note, however, that May building permits in Chicago kept pace with those for the same month a year ago. Mill bookings in plain material are comparatively light, but promise of better business is found in the low stocks in the hands of fabricators and other consumers. No definite change in mill prices is to be noted in this immediate section, although concessions have been made in territories intermediate between Chicago and other producing centers.

The mill quotation on plain material is 2.45c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Bars.—Demand is light and prices have given no further ground in soft steel bars, bar iron or rail steel bars.

Mill prices are: Mild steel bars, 2.25c. to 2.35c., Chicago; common bar iron, 2.25c. to 2.30c., Chicago; rail steel, 2.20c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting are 4c. for rounds and 4.50c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.45c. to 2.50c., base; hoops, 4.45c.; bands, 3.95c.

Sheets.—Possibly on account of the holiday, the past week was notably unproductive of new business. In general, independent mills are holding steadily to the minimum prices named below. There continues to be some inquiry for light black sheets from Japan, but sharp English competition is preventing much, if any, of this business from reaching American mills.

Mill quotations are 3.65c. to 3.85c. for No. 28 black, 2.80c. to 3c. for No. 10 blue annealed, and 4.80c. to 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago: 4c. for blue annealed; 4.70c. for black and 5.60c. for galvanized.

Wire Products.—In an exceptionally quiet week, there have been no new developments in the price situation. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1686.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, \$3.40 to \$3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, 3.60c. to 3.80c. per 100 lb.; cement coated nails, 3c. to 3.25c. per keg.

Rails and Track Supplies.—Demand for track supplies is disappointing and indicative, no doubt, of ultra conservatism on the part of the railroads pending stabilization of the steel market. The attitude of the Western roads is also probably influenced by adverse business conditions in the agricultural States.

Standard Bessemer and open-hearth rails, \$43; light rails, rolled from billets, 2.10c., f.o.b. makers' mills.

Standard railroad spikes, 3.10c. mill; track bolts with square nuts, 4.10c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.75c. base, and track bolts, 4.75c. base.

Coke.—Local by-product foundry coke remains unchanged at \$11.50 delivered Chicago, switching district. Connellsville foundry has shown further weakness and

is now offered at as low as \$4.25 oven or \$8.41 delivered Chicago.

Bolts and Nuts.—With demand at low ebb, prices are weak and show considerable variation. On large machine bolts, 70 and 5 off, Chicago, has been done, but 60 and 20 off is a more representative quotation. Bolt makers find encouragement in the fact that neither jobbers nor manufacturing consumers have heavy stocks.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.95c.; machine bolts up to $\frac{1}{2}$ x 4 in., 55 and 5 per cent off; larger sizes, 55 and 5 off; carriage bolts up to $\frac{1}{2}$ x 6 in., 50 and 5 off; larger sizes, 50 and 5 off; hot pressed nuts, squares and hexagons, tapped, \$3.50 off; blank nuts, \$3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Cast-iron Pipe.—Pipe is the one commodity in the iron and steel market for which demand is still active. Pipe shops are comfortably booked ahead and are now receiving a large number of small fill-in orders from municipalities, supplementing larger tonnages placed previously. In addition, a number of fresh awards of good size are reported. The Department of Public Works, Detroit, has recommended the division of 6,800 tons between the United States Cast Iron Pipe & Foundry Co., The American Cast Iron Pipe Co., and the Lynchburg Foundry Co., but a formal award has not yet been made. The United States company will also furnish several hundred tons for Lucas County, Ohio, 250 tons for Winona, Minn., and 100 tons for West Concord, Minn. Chicago has awarded 100 tons of fittings in the National Cast Iron Pipe Co., and the same company will furnish 170 tons of pipe for Libertyville, Ill. Kimberly, Wis., takes bids June 4 on 575 tons. Chicago receives tenders June 11 on 110 tons of 30-in. Elmhurst, Ill., took figures June 2 on 140 tons. The South Park Commissioners, Chicago, have taken bids on 300 tons. Prices, while showing little change, appear to average about 50c. a ton lower than heretofore.

We quote per net ton, f.o.b. Chicago, as follows:
Water pipe, 4-in., \$58.70 to \$59.70; 6-in. and over, \$54.70 to \$55.70; Class A and gas pipe, \$5 extra.

Old Material.—Consumers continue to stay out of the market and with old orders expiring, prices are again declining. Basic open-hearth steel grades are unchanged, but this is accounted for, in part, by the belief that an important local interest may soon re-enter the market. Railroad offerings continue to be generous, including the following: Chicago and North Western, 5,500 tons; Santa Fe, 3,800 tons; The St. Paul and the Chesapeake & Ohio, 2,000 tons each; the Erie and the New York Central, blank lists.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton		
Iron rails	.....	\$17.00 to \$17.50
Cast iron car wheels	.....	16.00 to 16.50
Relaying rails, 56 and 60 lb.	.....	26.00 to 27.00
Relaying rails, 65 lb. and heavier	.....	27.00 to 32.00
Forged steel car wheels	.....	17.00 to 17.50
Railroad tires, charging box size	.....	17.00 to 17.50
Railroad leaf springs, cut apart	.....	17.00 to 17.50
Rails for rolling	.....	15.00 to 15.50
Steel rails, less than 3 ft.	.....	16.50 to 17.00
Heavy melting steel	.....	13.75 to 14.25
Frogs, switches and guards cut apart	.....	14.00 to 14.50
Shoveling steel	.....	13.50 to 14.00
Drop forge flashings	.....	10.00 to 10.50
Hydraulic compressed sheets	.....	10.50 to 11.00
Axle turnings	.....	12.00 to 12.50
Steel angle bars	.....	15.50 to 16.00
Steel knuckles and couplers	.....	17.00 to 17.50
Coil springs	.....	18.50 to 19.00
Low phos. punchings	.....	15.50 to 16.00
Machine shop turnings	.....	7.00 to 7.50
Cast borings	.....	10.00 to 10.50
Short shoveling turnings	.....	10.00 to 10.50
Railroad malleable	.....	17.50 to 18.00
Agricultural malleable	.....	16.50 to 17.00

Per Net Ton		
Iron angle and splice bars	.....	16.00 to 16.50
Iron arch bars and transoms	.....	17.00 to 17.50
Iron car axles	.....	24.00 to 24.50
Steel car axles	.....	16.00 to 16.50
No. 1 busheling	.....	9.50 to 10.00
No. 2 busheling	.....	7.50 to 8.00
Pipes and flues	.....	8.50 to 9.00
No. 1 railroad wrought	.....	11.75 to 12.25
No. 2 railroad wrought	.....	12.25 to 12.75
No. 1 machinery cast	.....	17.00 to 17.50
No. 1 railroad cast	.....	16.50 to 17.00
No. 1 agricultural cast	.....	16.50 to 17.00
Locomotive tires, smooth	.....	14.75 to 15.25
Stove plate	.....	14.00 to 14.50
Grate bars	.....	13.50 to 14.00
Brake shoes	.....	13.50 to 14.00

Reinforcing Bars.—Lettings have fallen off notice-

ably and this may be due to increasing difficulty in financing new projects. There is still a large amount of pending work undisposed of, and fresh tonnages continue to come on to the market. The price situation is still weak, but 2.45c., Chicago, still represents a fair average warehouse quotation. Awards include:

Nurses' Home, Highland Park, Mich., 100 tons to McRae Steel Co.

Wieboldt Store addition, Chicago, 350 tons to Barton Spiderweb System Co.

Illinois State highway and bridge work, 175 tons to Concrete Steel Co.

U. S. Radiator Co., plant addition, Detroit, 120 tons to Concrete Steel Co.

Pending work includes:

Memorial Masonic Temple, Forty-ninth Street and Drexel Boulevard, Chicago, 200 tons, W. J. Bendus, Chicago, architect.

Immel State Bank building, Chicago, 100 tons, Clarence Hatzfeld, Chicago, architect.

Pioneer State Bank building, Chicago, 100 tons, K. M. Vitzthum, Chicago, architect.

Mutual Packing Co. plant, Union Stock Yards, Chicago, Packers' Architectural & Engineering Co., architect, 100 tons.

Cicero Bridge, Sanitary District of Chicago, 100 tons, general contract awarded to Fitzsimons & Connell.

Becklenberg Theater, Chicago, 100 tons.

Detroit Scrap Market

DETROIT, June 3.—With one or two of the mills in the market for blast furnace material, the Detroit scrap market has maintained a level for the past two or three weeks. Some inquiry is developing on pig iron, and melters generally will be clear of their commitments by the beginning of the third quarter. Prices are the same as a week ago.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting steel	.....	\$12.50 to \$13.50
Shoveling steel	.....	12.50 to 13.50
Borings	.....	9.50 to 10.50
Short turnings	.....	9.50 to 10.50
Long turnings	.....	8.50 to 9.00
No. 1 machinery cast	.....	15.00 to 16.00
Automobile cast	.....	21.00 to 23.00
Hydraulic compressed	.....	10.00 to 10.50
Stove plate	.....	13.50 to 14.50
No. 1 busheling	.....	9.50 to 10.50
Sheet clippings	.....	8.00 to 8.75
Flashings	.....	9.00 to 9.75

Youngstown Scrap Market

YOUNGSTOWN, June 3.—If the scrap market shows any tendencies this week, it is in the direction of still greater weakness, owing to the curtailment in blast furnace and steel-making operations by Valley interests. The \$16 quotation on heavy melting is simply a nominal figure, as most selling interests agree they would accept tonnage at least 50c. per ton less. Buyers are not contracting for future tonnages.

Depression in the old metals market is proportionately as marked as in finished steel lines, and middle interests look for little betterment until mill operations respond to larger buying.

Stock Held by Employees

Though no effort has been made by the United Engineering & Foundry Co., with plants at Pittsburgh, Youngstown, Canton and Vandergrift, Pa., to induce ownership of stock in the company by employees, nevertheless at the end of last year the company had 121 employee stockholders, exclusive of company officers, who held 10,229 shares or a par value of \$1,022,900. The company's total outstanding capital is a little less than \$9,000,000, so that about one-eighth of the company was owned by employee stockholders, states President F. C. Biggert, Jr. In the meantime, additional stock has passed into the hands of employees. "It is worth mentioning," states Mr. Biggert, "that this stock was bought in the open market without any inducement beyond the confidence of the employees in the soundness and integrity of the company, and much of it at prices far above par value."

New York

Radiator Company in Market for Considerable Tonnage of Pig Iron

NEW YORK, June 3.—Reports in regard to the American Radiator Co. being in the market for pig iron have become more definite and it is established that inquiries amounting to fully 50,000 tons have been sent out, and it is also known that some of the tonnage has been purchased. Aside from the Radiator company inquiry, the largest pending tonnage has been that of the Worthington Pump & Machinery Corporation, 7200 tons, and about half of this has been purchased. Numerous other tonnages are pending. Sales in New York the past week amounted to about 15,000 tons, regardless of the Radiator business. Prices are still weak, \$21, furnace, being shaded in eastern Pennsylvania, while at Buffalo as low as \$19 has been done, but the prevailing quotation now seems to be about \$20.

We quote delivered in the New York district as follows, having added to furnace price \$2.27 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	\$23.77 to \$24.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.27 to 23.77
East. Pa. No. 2, sil. 1.75 to 2.25 ..	22.77 to 23.27
Buffalo, sil. 1.75 to 2.25	23.91 to 24.41
No. 2X Virginia, sil. 2.25 to 2.75 ..	31.44
No. 2 Virginia, sil. 1.75 to 2.25 ..	30.44

Ferroalloys.—Demand for both ferromanganese and spiegeleisen is still limited to small lots for early delivery. One sale of 50 tons of ferromanganese is noted. There has been no change in prices.

Coke.—There is little change from the situation of last week. Standard foundry is quotable at from \$4.50 to \$5 per ton and standard furnace at from \$3.50 to \$4 per ton. By-product is \$10.41 Newark and Jersey City, N. J.

Cast-Iron Pipe.—Makers are booked up to three months ahead in some cases and prices are holding fairly firm. Local purchases by private water and gas companies continue. Municipal tenders from New England have not as yet appeared in any number. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, \$61.60 to \$63.60; 4-in. and 5-in., \$66.60 to \$68.60; 3-in., \$76.60 to \$78.60, with \$5 additional for Class A and gas pipe. Makers report production at a low ebb and although jobbers' stocks are undoubtedly low, but little buying is reported. Some of the smaller makers are inclined to shade current prices, but on the whole there is no change in quoted discounts. We quote discounts of both Southern and Northern makers, f.o.b. New York, as follows: 6-in., 29½ to 30¾ per cent off list; heavy, 39½ to 40¾ per cent off list.

Warehouse Business.—The total of small orders to which the great majority of purchases from stock is now confined, will probably be equal in May to the total for April. There is a fairly active demand for bars, but structural inquiries are almost exclusively for small tonnages. On many grades, sellers report the larger orders, usually taken from warehouse stocks, going to the mills. Galvanized sheets are reported particularly firm and but little shading is noted on black sheets, 4.85c. and 5.85c. per lb. base, respectively, being about the minimum prices. Prices of spring steel out of stock are holding firmly, despite the acceptance by mills of lots of a few tons. Jobbers stocking pipe report a fair demand for extremely small tonnages. We quote prices on page 1710.

Old Material.—In general the market shows more strength, which has confined its effect thus far to a cessation of the decline of recent weeks. On a few grades a slight advance is noted. A recent sale of forge fire to an eastern Pennsylvania consumer, warrants payment of \$12.25 per ton delivered, a slight advance over the recently prevailing price. Cast borings are also firmer with \$13 per ton delivered to Harrisburg being paid. Specification pipe is moving to consumers at both Lebanon and Milton at \$14 to \$14.25

per ton delivered. Although shipments to Bethlehem of heavy melting steel are still under embargo, borings and turnings are reported again going forward, so that brokers are enabled in most cases to complete old orders. Stove plate is unchanged at \$13.50 to \$13.75 per ton delivered to a New Jersey consumer. Heavy melting steel is firm, but no increase in price is being offered, prevailing purchases ranging from \$14 to \$14.50 per ton delivered to eastern Pennsylvania consumers.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	\$10.25 to \$10.75
Steel rails, short lengths, or equivalent	11.00 to 11.50
Rails for rolling	14.00 to 14.50
Relaying rails, nominal	24.00 to 25.00
Steel car axles	16.00 to 17.00
Iron car axles	23.00 to 24.00
No. 1 railroad wrought	14.00 to 14.50
Forge fire	8.25 to 8.75
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	8.75 to 9.25
Machine-shop turnings	7.25 to 7.75
Mixed borings and turnings	7.25 to 7.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.00 to 10.50
Stove plate	10.75 to 11.75
Locomotive grate bars	11.50 to 12.00
Malleable cast (railroad)	No market
Cast iron car wheels	14.00 to 14.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	\$15.50 to \$16.00
No. 1 heavy cast (columns, building materials, etc.), cupola size ..	14.50 to 15.00
No. 1 heavy cast, not cupola size ..	10.50 to 11.00
No. 2 cast (radiators, cast boilers, etc.)	12.50 to 13.00

Finished Iron and Steel.—Continuance of the strike of steel erectors in New York has had a more serious effect in the past week on lettings of structural work. Considerable work is in contemplation, but a good deal may go over until late summer or early fall unless an early settlement of the strike makes it appear possible that work on more buildings can be undertaken. Erectors are at work on some jobs, but a full force of men is not yet engaged throughout the city. Demand for steel products from consumers and jobbers reached a new low point last week. The holiday at the end of the week, which by many plants was observed as a double holiday, interfered to a considerable extent even with routine orders. Steel companies are showing a little more resistance toward the urging of buyers for further price concessions. One large Pittsburgh company is reported to have informed some of its trade that it will not under any circumstances go below 2.10c. on plates, shapes and bars. In some cases it has not yet reached that figure. On plates and shapes Eastern mills continue to make the low prices. Plates are now commonly quoted at 2c., Pittsburgh, for a carload or more, and, as previously reported, this figure has been shaded on very desirable business. Shapes are fairly steady at 2.10c., Pittsburgh. The larger producers of bars, who are quoting 2.25c., Pittsburgh, are finding that the \$5 a ton spread between plates and bars makes it difficult to convince buyers that 2.25c. can long be maintained. Concessions of \$1 a ton are being given on concrete bars and apparently some of the smaller mills that do not roll a complete range of bar sizes are also quoting this price on merchant steels, particularly that rolled from scrap. Except for one or two small sheet mills, which are conceding about \$1 a ton, sheet mills are quite uniformly adhering to 3.65c. on black, 4.80c. on galvanized and 2.80c. on blue annealed, Pittsburgh basis. Consumption of pipe in the East has not been up to expectations and most of the pipe jobbers are carrying fairly large stocks. Until recently the demand upon mills for pipe was the outstandingly strong feature of the steel trade, but as it will take the jobbers a considerable time to work off stocks pipe business has slumped along with other steel products. Jobbers of miscellaneous steel products, on the other hand, have worked their stocks down to a low point. Few are overstocked and most of them are carrying less than their normal requirements. Stocks in the hands of consumers have also gone into consumption, and in this respect the situation is so sound that any slight upturn in business will be quickly reflected in demand upon mills. The largest steel inquiry here is for 2500 tons of plates, which the Standard Oil Co. of Louisiana may buy for construction of tanks.

It is believed that this business will go to a Western or Southern mill. The New York Shipbuilding Corporation was low bidder on two municipal ferries of the city of New York requiring about 1500 tons of steel. Local or nearby tank shops have asked for prices on 500 tons of $\frac{1}{4}$ -in. plates for a smokestack on a building to be erected for the Public Service Corporation of New Jersey. The almost complete absence of railroad buying of cars and locomotives is one of the most discouraging features of the steel trade.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.54c.; plates, 2.34c. to 2.49c.; structural shapes, 2.44c. to 2.64c.; bar iron, 2.49c.

Buffalo

Considerable Tonnage of Pig Iron Sold at Lower Quotations

BUFFALO, June 3.—Pig iron inquiry for the current week listed 15,000 to 20,000 tons, but some purchasing has been made without the business having reached inquiry form. One local maker took 3000 to 4000 tons of foundry for third quarter as part of a larger inquiry. This maker also took 1500 to 2000 tons of foundry in one order, also 500 tons of basic. Its prices are \$19 base, \$19.50 and \$20 for the next two silicon grades, \$19 for basic and \$19.50 for malleable. This interest sold 8000 tons altogether. Another company has taken some 1000-ton lots of foundry aggregating considerable tonnage at between \$19 and \$19.50. Still another seller has taken 5000 to 6000 tons without having to go below \$20. One producer has blown out one furnace and is soon to bank another. Current inquiry shows one for 3000 tons of foundry from the East, a Pennsylvania inquiry for 1000 tons of off iron, 5000-ton foundry inquiry for third quarter and a 3500-ton foundry inquiry for second quarter.

We quote f.o.b., gross ton, Buffalo, as follows:

No. 1 foundry, sil. 2.75 to 3.25...	\$20.00
No. 2 foundry, sil. 2.25 to 2.75...	\$19.00 to 20.00
No. 3 plain, sil. 1.75 to 2.25...	19.00 to 20.00
Basic	19.00
Malleable	19.50
Lake Superior charcoal.....	29.28

Finished Steel.—The market is spotty, with some sellers reporting conditions considerably better and others seeing only a slight improvement. The consensus of opinion is that the situation is at least slightly better. Pipe sentiment is improved. The average jobber expected some weakening in prices, but this not developing, a lowering of stocks has forced some buying. This affects butt-weld mostly. Difference of opinion exists as to whether the price of 2.25c. on bars is really nominal or not. Some authorities believe that the price has firmed to 2.25c., while others believe, 2.20c. could be done on a tonnage of good proportions. A good order of plates would bring out 2.20c. or lower, it is thought. Small Eastern mills are said to be quoting lower than 2.20c. on plates. There appears to be a firmness toward 3.65c. on black sheets, and the 4.80c. price on galvanized sheets is firm. A Canadian company is understood to have bought 5000 tons of skelp from an American maker at around \$1.80. The Adam, Meldrum & Anderson Co. department store addition, it has been learned, was placed with the Pittsburgh Bridge & Iron Co. It amounted to about 600 tons. The Kellogg Structural Steel Co. took 450 tons for a school building in Dunkirk, N. Y.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5c.; cold-rolled and round shafting, 4.45c.

Old Material.—Little change is apparent in the slow market. Very little buying is being done. One mill is picking up "distress" tonnage now and then at low prices, but the other mills are idle from the purchasing standpoint. One mill is still holding up some shipments, while it is taking in some compromise orders. Canadian buying is dull, buyers there being unable to

name a price on No. 1 cast and malleable, interesting to local dealers. Railroad lists are due between June 3 and 6. The Pennsylvania Railroad, it is understood, will dispose of about 41,000 tons, while the other roads will have good lists. Some demand exists for stove plate, which is said to be fairly strong at \$16. The complexion of stove plate has changed considerably, dealers point out. It is no longer cast iron, and but for the furnace grates and sides, the heavy component parts would be almost entirely lacking.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel.....	\$14.00 to \$15.00
Low phos., 0.04 and under.....	17.00 to 18.00
No. 1 railroad wrought.....	12.50 to 13.00
Car wheels	17.50 to 18.00
Machine shop turnings.....	10.00 to 10.50
Cast iron borings.....	12.00 to 12.50
No. 1 busheling.....	13.00 to 13.50
Stove plate	15.00 to 16.00
Grate bars	14.50 to 15.00
Bundled sheets	8.00 to 9.00
Hydraulic compressed	13.50 to 14.00
Railroad malleable	19.00 to 19.50
No. 1 machinery cast.....	16.50 to 17.50

Boston

Small but Steady Buying of Pig Iron Is Still Going On

BOSTON, June 3.—Small but steady buying of pig iron is still going on in this territory, with several thousand tons changing hands the past week. Buffalo furnaces continue to take the bulk of the business. Reflecting the well covered position of melters, the major portion of iron bought recently is for third quarter delivery. Buffalo No. 2X has sold at \$19.50 furnace, and No. 1X at \$20 more often than at higher prices. One buyer claims to have purchased No. 2X at \$19, but this report cannot be verified. One eastern Pennsylvania furnace heretofore on a \$22 furnace base, offered 5000 tons the past week at \$20.50, \$21 and \$21.50 for No. 2 plain, No. 2X and No. 1X, respectively, and after disposing of some tonnage, went back to its previous basis. One furnace having a \$3.65 freight rate into New England is reported to have sold 500 tons No. 1X iron to a Springfield, Mass., foundry at a delivered price under \$19 on cars Buffalo. A Westfield, Mass., foundry has announced it will be in the market after June 10 for 6000 to 7000 tons No. 2 plain iron, and three machinery manufacturers are dickering on an aggregate of more than 1500 tons of higher silicon. These and other prospects bring the total prospective business up to around 10,000 tons, the largest amount on this buying movement. In the past week 250 tons of Indian iron was landed here, it having been previously sold. The market for Indian and Continental irons is softer in sympathy with the Buffalo market.

We quote delivered prices on the basis of the latest reported sales as follows, having added \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia and \$9.60 from Alabama:

East Penn., sil. 2.25 to 2.75.....	\$25.15 to \$26.15
East Penn., sil. 1.75 to 2.25.....	24.65 to 25.65
Buffalo, sil. 2.25 to 2.75.....	24.41 to 25.41
Buffalo, sil. 1.75 to 2.25.....	24.41 to 24.91
Virginia, sil. 2.25 to 2.75.....	31.42 to 32.42
Virginia, sil. 1.75 to 2.25.....	30.92 to 31.92
Alabama, sil. 2.25 to 2.75.....	31.10 to 32.10
Alabama, sil. 1.75 to 2.25.....	30.60 to 31.60

Coke.—Both the New England Coal & Coke Co. and the Providence Gas Co. have announced that the price of by-product foundry coke for June is \$12 a ton delivered within New England, unchanged from May. Brokers report that specifications on contract for June shipment are coming in slowly and that indications are that the aggregate shipments for the month will fall considerably under those for May, due to a further contraction in the weekly New England iron melt, as well as to the fact that many foundries already are carrying round tonnages of fuel in yards. Connells-ville oven interests, heretofore active in this territory, have practically withdrawn.

Shapes and Plates.—Plates are still available at 2c., f.o.b. Pittsburgh and shapes at 2.15c., but buying is limited as consumers expect still lower prices or are

endeavoring to reduce inventories. Prospective fabricating business is decreasing rather than increasing, as anticipated last month.

Soft steel bars, \$3.51½ per 100 lb. base; flats, \$4.40; plain and deformed concrete bars, \$3.76½; small angles, channels and tees, \$3.51½; structural steel, large angles and beams, \$3.61½; tire steel, \$4.80 to \$5.15; open-hearth spring steel, \$5 to \$8; crucible spring steel, \$12; steel bands, \$4.31½ to \$5.20; hoops steel, \$5.80 to \$6.30; cold rolled steel, \$4.35 to \$4.85; toe calk steel, \$6.15; heavy plates, \$3.61½; light plates, \$3.86½; diamond pattern plates, stock sizes, \$5.90; blue annealed sheets, \$4.51½; re-fined iron bars, \$3.51½; best refined iron bars, \$4.75; Wayne, \$5.50; Norway rounds, \$6.60; Norway squares and flats, \$7.10.

Cast Iron Pipe.—Chicopee, Mass., this week will award 1300 tons of 20-in. pipe, the largest tonnage available in this market for some time. Boston has awarded 200 tons of 24-in. pipe to the United States Cast Iron Pipe & Foundry Co. No change in pipe prices is reported, but it is intimated the Chicopee business will bring out some concessions.

Old Material.—Sentiment in the old material market is more hopeful than it has been in weeks. Prices, however, have not improved and passing business is still limited. Local brokers report it is intimated greater activity may be experienced shortly, which accounts for the change for the better in sentiment. New England consumers show virtually no interest in material. Foundries are still able to supply machinery cast requirements from local or nearby yards, and large consumers of steel, etc., with one exception, are not sufficiently active to warrant purchases. A Worcester, Mass., mill, however, is still reported as negotiating for round tonnages of steel. Machine shop turnings, chemical borings, heavy melting steel, in the order named, are the most active materials.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$20.50 to \$21.00
No. 2 machinery cast.....	17.50 to 18.00
Stove plates	15.00 to 15.50
Railroad malleable	15.50 to 16.00

The following prices are offered per gross ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$10.00 to \$10.50
No. 1 railroad wrought.....	12.50 to 13.00
No. 1 yard wrought.....	11.50 to 12.00
Wrought pipe (1-in. in diam., over 2 ft. long).....	9.50 to 9.75
Machine shop turnings.....	6.50 to 7.00
Cast iron borings, chemical.....	8.50 to 9.00
Cast iron borings, rolling mill....	7.00 to 7.50
Blast furnace borings and turnings	6.50 to 7.00
Forged scrap and bundled skeleton	7.00 to 7.50
Shafting	15.00 to 15.50
Street car axles.....	15.00 to 15.50
Rails for rolling.....	11.00 to 11.50

Cincinnati

Sales of 20,000 Tons of Southern Pig Iron to Pipe Company Is Reported

CINCINNATI, June 3.—The Cincinnati district is still devoid of activity though large Eastern interests having plants in this district are showing interest. A radiator corporation with a plant in southern Ohio is inquiring for 3000 tons of foundry, and a large pipe company is understood to have bought 20,000 tons of Southern iron for Southern plants, and to be figuring on several thousand tons for a plant in Ohio. The Worthington Pump inquiry for 800 tons for Cincinnati has not been closed, but it is reported that less than \$21, Ironton, has been quoted. Sales of foundry and malleable grades run generally to 100 tons and less, though one interest took 500 tons of foundry last week. A steel foundry bought 500 tons of basic on the basis of \$20, Ironton, a reduction of \$1. This is the only price change noted. There were no transactions in Southern irons reported in this territory, and the price is unchanged at \$21, Birmingham, this being the figure at which the tonnage referred to above was placed.

Based on freight rates of \$4.05 from Birmingham and \$2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)....	\$25.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.55
Ohio silvery, 8 per cent.....	32.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.27
Basic Northern	22.27
Malleable	23.27

Sheets.—Carload orders predominate, with prices rather weak. While the regular market is generally considered to be 2.80c., 3.60c. and 4.80c. for blue annealed, black and galvanized sheets respectively, it is said to be possible to place tonnages of black sheets at 3.50c. and galvanized at 4.60c. These prices have been quoted in Southern territory.

Structural Activity.—Inquiries were conspicuously absent during the past week. An award of a gas holder at Memphis, Tenn., involving 3000 tons of shapes and plates, was reported.

Reinforcing Bars.—A number of sizable projects will come to a head this week, including 1000 tons for the Cincinnati Rapid Transit Commission, and approximately 1000 tons for viaducts in Indianapolis, general contracts for which have been let to Milwaukee contractors. The Union Gas & Electric Co., Cincinnati, will shortly award the contract for Baker Street substation, requiring 200 tons. Prices are about the same as last week, the range being from 2c. for rail steel bars to 2.25c. for bars rolled from new billets.

Warehouse Business.—Local jobbers report only a fair movement of products, orders generally being small, though occasionally carload orders of reinforcing bars and small angles are booked. Wire products, especially nails, are reported moving in slightly improved volume. Prices are unchanged.

Tool Steel.—Business is very quiet, no large orders or inquiries appearing during the past week or two. Prices are unchanged, 18 per cent tungsten high speed steel being quoted at 70c. to 90c. per lb., according to brand.

Coke.—Carload sales continue as the market activity in coke, with prices soft, but unchanged from last week.

Connellsville furnace, \$3.25; foundry, \$4.75; New River foundry, \$9 to \$10; Wise County furnace, \$4; foundry, \$4.75; by-product foundry, \$7.50; Connells-ville basis.

Old Material.—There is a better feeling noticeable among some of the scrap dealers, but this hardly can be accounted for by consumer activity, as sales are still light. Higher prices have been offered on some items needed to fill existing contracts, but as a general proposition, the market is in the same position as it has been for some weeks, and prices are unchanged and largely nominal.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton

Heavy melting steel.....	\$11.00 to \$11.50
Scrap rails for melting.....	10.50 to 11.00
Short rails	15.50 to 16.00
Relaying rails	27.00 to 27.50
Rails for rolling.....	12.50 to 13.00
Old car wheels.....	11.50 to 12.00
No. 1 locomotive tires.....	12.50 to 13.00
Railroad malleable	13.50 to 14.00
Agricultural malleable	12.50 to 13.00
Loose sheet clippings.....	7.00 to 7.50
Champion bundled sheets.....	9.00 to 9.50

Per Net Ton

Cast iron borings.....	7.50 to 8.00
Machine shop turnings.....	6.50 to 7.00
No. 1 machinery cast.....	16.50 to 17.00
No. 1 railroad cast.....	13.00 to 13.50
Iron axles	19.50 to 20.00
No. 1 railroad wrought.....	9.00 to 9.50
Pipes and flues.....	6.00 to 6.50
No. 1 busheling.....	7.50 to 8.00
Mixed busheling	5.00 to 5.50
Burnt cast	9.00 to 9.50
Stove plate	9.00 to 9.50
Brake shoes	10.00 to 10.50

Finished Materials.—There is little change in the situation as regards finished materials, orders being confined to carload lots for immediate shipment. The largest inquiry to come out is for 300 tons of plates from a Kentucky manufacturer. It is reported that on this inquiry less than 2.10c., Pittsburgh, was quoted. The business has not been placed. The regular quotation on plates and shapes is now 2.20c., Pittsburgh, and on bars nothing lower than 2.25c. has appeared in this market. Cold-rolled materials are very quiet, and some consumers have asked mills to suspend shipments for several weeks. Prices continue to range from 2.85c. to 3c. Hoops and bands are inactive at 2.75c. A stiffening of bolt and nut prices is reported and there seems

little disposition on the part of makers to go below prevailing prices. The demand for wire products continues light, and there are consistent reports of price cutting on fence wire. Wire nails are available at \$2.90, mill, and some manufacturers are reported to have offered nails in Cincinnati market at \$3.05, delivered.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.25c.; cold-rolled flats, squares and hexagons, 4.75c.; open-hearth spring steel, 5c. to 6c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.35c.; No. 9 annealed wire, 3.60c.; common wire nails, \$3.40 per keg base; cement coated nails, \$3 per keg.

Birmingham

Pig Iron Moving by Rail and Water Route to St. Louis and Chicago

BIRMINGHAM, ALA., June 3.—There is still warrant for steady production of pig iron in this district, but it is problematical how long this condition will continue. There has been but little foundry iron sent to the surplus piles on furnace yards. Basic iron is accumulating, but there is not much apprehension in this regard, for once the steel mills get back to their former activity there will be a steady reduction of this stock. Several orders for from one to three tons of iron have been received from consumers just this side or through the Ohio River gateway. Alabama iron is moving into the St. Louis and Chicago territories, via barge to Metropolis, Ill., on the Tennessee and Ohio rivers from Sheffield, the freight differentials being of consideration in meeting competition in that section.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

No. 1 foundry, 2.25 to 2.75 sil.	\$21.50
No. 2 foundry, 1.75 to 2.75 sil.	21.00
Basic	21.50
Charcoal, warm blast	31.00

Cast Iron Pipe.—Lettings received by the cast iron pressure pipe manufacturing companies of this district recently have been in line with those of the past four weeks, so far as volume is concerned. There is enough business to warrant capacity production for some time.

We quote class B, 4-in. water, \$52 to \$53; 6-in. and over, \$48 to \$49; class A, \$5 higher; standard soil pipe, \$60; heavy gage, \$45; standard fittings, \$110.

Finished Material.—The wire and nail mills are curtailing production, new business being light. Reduction in nail prices brings out no new business. The Gulf States Steel Co. has put two open-hearth furnaces in operation again and there is some decrease in the finishing departments. Structural steel business is somewhat improved and the several plants in this district are encouraged and believe there will be activity through the summer. The Ingalls Iron Works Co. is making shipment on its contract for 2000 tons of structural steel for an automobile assembling plant being erected at Norfolk, Va., by Henry Ford. The same company has a new order for structural steel to be shipped into Mexico, 700 tons, the second order in the last three months. Concrete bars are selling in a little better quantity, the Tennessee and the small rolling mill companies shipping in various directions. Steel bars quoted at 2.35c. to 2.40c., Birmingham.

Coke.—The coke market in the South is holding its own well, no change in the conditions as have existed now for several weeks being noted. All by-product coke oven plants in this section, independent plants as well as those of the iron and steel companies, are in practically full operation. The bee-hive coke ovens going are finding a ready demand for their output. The Barret Co. is still manufacturing pitch coke but has less than 100 bee-hive ovens in operation.

Scrap Iron and Steel.—Although very inactive, the scrap iron and steel market in the Birmingham district gets more or less attention every week. The quotations have had some readjustment again and lower prices are noted among several grades. Dealers are taking the situation in a matter of fact way, unable to give opinion as to when they expect an improvement. Con-

sumers are not buying country scrap but are seeking prepared old material.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Cast iron borings, chemical	\$15.00 to \$16.00
Heavy melting steel	13.50 to 14.00
Railroad wrought	11.50 to 12.00
Steel axles	17.00 to 18.00
Iron axles	20.00 to 20.50
Steel rails	13.00 to 14.00
No. 1 cast	18.50 to 19.00
Tram car wheels	17.00 to 18.00
Car wheels	16.00 to 17.00
Stove plate	15.50 to 16.50
Machine shop turnings	7.00 to 8.00
Cast iron borings	7.50 to 8.50
Rails for rolling	15.50 to 16.00

St. Louis

Southern Iron Sold at Less Than \$21, Birmingham, to Stove Manufacturers

ST. LOUIS, June 2.—A price of less than \$21, Birmingham, made by the Sloss-Sheffield Steel & Iron Co for barge and rail shipment brought forth orders this week totaling 3000 tons of pig iron to stove manufacturers and other melters on the east and west side of the St. Louis industrial district. The iron is to be shipped during the third quarter. One stove plant bought 600 tons, there were three 500-ton orders and the remainder was in small lots. Of the St. Louis Coke & Iron Co. sales of 1200 tons during the week, 600 tons went to a St. Louis stove foundry, while another stove manufacturer bought 200 tons for June and July delivery. Another interest reports the sale of 500 tons, including 100 tons of high silicon. There are no inquiries of size pending, although melters generally are taking more interest in their requirements for third quarter. Southern iron is quoted at \$21, Birmingham; Northern at \$22, Chicago, and Granite City at \$23 to \$23.50 at the furnace. But these quotations are nominal, and each transaction is closed only after dickering. The Federal Reserve Bank of St. Louis reports that April sales of stove manufacturers in the Eighth Federal Reserve District, seven reporting, were 18.3 per cent under April, 1923, and 10.6 per cent less than March, 1924, while job foundries, 5 reporting, decreased 19.9 per cent under April, 1923, and 14.3 per cent under March, 1924.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.16 freight from Chicago, \$3.28 from Florence and Sheffield (rail and water), \$5.17 from Birmingham, all rail, and \$1c. average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	\$24.16 to \$26.16
Northern malleable, sil. 1.75 to 2.25	24.16 to 25.16
Basic	24.16 to 25.16
Southern fdy., sil. 1.75 to 2.25 (rail)	26.17
Southern foundry, sil. 1.75 to 2.25 (rail and water)	24.28
Granite City iron, sil. 1.75 to 2.25	23.81 to 24.81

Coke.—The market for coke is generally quiet, although slightly greater interest is being shown in domestic grades by dealers, who are beginning to look after their requirements for next fall.

Finished Iron and Steel.—Buying continues light. Manufacturers using steel products and other buyers continue to buy only from hand-to-mouth. All orders are marked rush, and these are followed by letters and telephone requests to speed up shipments. The only railroad inquiry of consequence was issued by the Missouri Pacific for 150 tons of shapes and plates.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled, one pass, 5c.; cold-rolled rounds, shafting and screw stock, 4.15c.; structural rivets, 3.90c.; boiler rivets, 4.10c.; tank rivets, $\frac{3}{4}$ -in. and smaller, 60 per cent off list; machine bolts, 55 and 5 per cent; carriage bolts, 40-5 per cent; lag screws, 60 and 5 per cent; hot pressed nuts, squares or hexagon, blank or tapped, \$3.50 off list.

Old Material.—Dealers are interested in two items only—railroad springs and locomotive tires, in which specialties there is a short interest on a contract given several weeks ago by an East Side consumer. Dealers are paying more for them than they are receiving. There is no demand for other items. Consumers are

showing no interest in the market. Railroad lists include: Pennsylvania System, 32,000 tons; Chicago & Alton, 900 tons; Chicago Belt Railway, 1000 tons; Missouri Pacific, 4500 tons; Chicago, Milwaukee & St. Paul, 1800 tons; Santa Fe, 4000 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	\$12.00 to \$12.50
Rails for rolling	14.00 to 14.50
Steel rails less than 3 ft.	15.00 to 15.50
Relaying rails, 60 lb. and under ..	25.00 to 26.00
Relaying rails, 70 lb. and over ..	32.50 to 33.50
Cast iron car wheels	14.00 to 14.50
Heavy melting steel	12.50 to 13.00
Heavy shoveling steel	12.50 to 13.00
Frogs, switches and guards cut apart	13.00 to 13.50
Railroad springs	15.75 to 16.25
Heavy axles and tire turnings ..	10.00 to 10.50
No. 1 locomotive tires	14.50 to 15.00
Per Net Ton	
Steel angle bars	12.50 to 13.00
Steel car axles	15.00 to 15.50
Iron car axles	21.00 to 21.50
Wrought iron bars and transoms ..	15.50 to 16.00
No. 1 railroad wrought	10.25 to 10.75
No. 2 railroad wrought	11.00 to 11.50
Cast iron borings	7.50 to 8.00
No. 1 busheling	10.25 to 10.75
No. 1 railroad cast	16.00 to 16.50
No. 1 machinery cast	17.50 to 18.00
Railroad malleable	13.50 to 14.00
Machine shop turnings	5.50 to 6.00
Champion bundled sheets	7.50 to 8.00

San Francisco

Cautious Policy Prevails—Fair Demand for Structural Steel

SAN FRANCISCO, May 28.—In some quarters the booking of business is reported as showing some slackening up but no significance is attached to this slight variation. The general economic conditions of the country seem to create an undercurrent of caution. Reports from Los Angeles show the same feeling there and for the present there are no visible indications of betterment. In referring to dullness it should be noted that it does not apply to steel for structural purposes or reinforcement uses. There is a large amount of new work under way and a still greater volume planned for the summer and autumn months. There are bond issues aggregating over \$100,000,000 yet to be submitted to the voters in various counties of California during the next few months and without doubt most of them will receive popular approval. The bulk of these vast expenditures will be for modern buildings which require heavy tonnages of structural steel. It has been estimated that in the San Francisco section of the State these requirements will be not less than 9000 tons while the southern part of the State will call for as much or more.

Pig Iron.—Sales are fair in volume and although there is some talk about shading asking figures, quotations are fairly well sustained. It is probable that the offering of French and Belgian iron at lower figures has had more influence in causing some easing off in prices on the English and Scotch products than any apparent dullness in business. Deliveries from the continent are now said to be more dependable as to time than six months ago and the sales are steadily increasing. Some 4200 tons are now on the way and most of it is virtually placed. Prices are quoted at about the same range as two weeks ago, \$27.50 to \$29, duty paid. The best grades of Scotch and English iron sell at \$30 to \$31 per ton and it is stated that discriminating buyers can secure round lots at 50c. off on these figures. There is some tonnage on the way and at least two cargoes are scheduled for early shipment.

Coke.—Arrivals of coke by sea have been liberal, but there is apparently no undue accumulation. Sales continue steady and of good volume and the recently reduced prices show no indications of weakness. For foreign grades in round lots \$18 to \$20 is still the prevailing market rate. A slightly increased tonnage of domestic coke figured in recent sales, the price being the current rate in the Eastern market on the day of purchase.

Finished Steel and Iron.—In a general way the mar-

ket is reported as spotted, that is, some branches are active and some lines are experiencing various degrees of dullness. There is a good inquiry for concrete reinforcing bars, the sales of the last two weeks being in excess of 1200 tons. Slightly lower prices are noted for merchant bars, some orders being placed at 2.70c. to 2.75c., c.i.f. San Francisco or San Pedro. The market for plates continues inactive but for structural shapes an improved inquiry is reported. While the orders of the last week or so have not been very large, business aggregating over 1900 tons is expected to be placed shortly. Rivets and bolts are selling well. One unusually large inquiry for rivets, involving 114 tons and another for 76 tons are expected to materialize before the middle of June. Several orders for 6-in. cast iron pipe for municipal uses are about to be placed and Los Angeles is expected to be in the market in a few weeks for some 400 tons, but there is a possibility that the additional requirement may be added to the orders awarded to French manufacturers some months ago.

Old Material.—The dullness which has prevailed in this branch of business for the last three months shows practically no change for the better. Prices have been easy and during the past week a marked decline occurred. Small quantities move slowly and the quoted rate is now \$12 to \$12.50, with little hesitancy in shading these figures to buyers who will take round lots. Although both mills and foundries are busy, their requirements for old material have been below the average for some time. There have not been any sales to Los Angeles from this part of the State for a month or more.

Cleveland

Increased Inquiry for Structural Shapes—More Pig Iron Buying

CLEVELAND, June 3.—While new steel business continues very light, there is an increase in inquiry for structural material for railroad bridge and track elevation work and other building work. This activity appears to have been stimulated by the recent price reductions on plain material, but at the same time a fair volume of other building work previously figured on is dragging along, prospective buyers, apparently, holding off with the expectation of getting more advantageous prices. Steel buying is still limited to small lots and orders for these are few. In this respect the market shows no change. In the automotive fields some business was placed during the week by parts manufacturers, but conditions in Detroit are still quiet and there are no indications of an early increase in production schedules. The outstanding award in the building field is the placing of 4000 tons by the Pennsylvania Railroad for grade crossing elimination bridges in Cleveland. Prices quoted by the larger producers have further declined, having settled down to 2.20c. on steel bars, plates and structural material. Plate prices with some of the smaller mills continue irregular with quotations of 2.10c. appearing in this territory. While an Ohio mill recently took an Eastern order for 3500 tons of locomotive plates, it is explained that the specifications called for acid steel and partly fire box steel carrying extras of \$30 a ton. The hot-rolled strip steel market is very dull and weak, with quotations ranging from 2.50c. to 2.60c. for strip and up to 2.75c. for narrow hoops and bands.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.55c. to 4.65c.; No. 28 galvanized sheets, 5.65c.; No. 10 blue annealed sheets, 3.65c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, \$3.30 per 100 lb.; No. 9 galvanized wire, \$3.75 per 100 lb.; common wire nails, \$3.40 base per 100 lb.

Pig Iron.—The revival of interest in the pig iron market noted last week has developed into a moderate buying movement, mostly in foundry iron for the third quarter, but with some of the contracts extended through the last half. The springing up of a demand is attributed to two factors. One is that many consumers feel that prices have reached bottom and the

other is that others have low stocks and have about cleaned up all their contracts, as is indicated by little unfilled tonnage on the books of some of the furnaces. Many consumers appear to be disposed to cover at the present time for their minimum requirements for the third quarter. The business is coming from scattered sources, but does not include any buying by the automotive industry, which will carry considerable iron due on second quarter contracts over to the third quarter. The market still has weak spots and there is a wide range of Lake furnace quotations depending on whether the inquiry being figured on is from a competitive territory. However, producers are beginning to show resistance to naming prices lower than have recently appeared. Considerable of the business placed during the week was taken at \$20.50, which appears to be the common minimum Valley and Lake furnace price. Locally there is no fixed price for outside shipment, quotations depending on the tonnage and the delivery point, but for Cleveland delivery \$22 is the minimum price. One interest reports sales during the week aggregating 10,000 to 15,000 tons and another several thousand tons in lots up to 2000 tons. One has about 10 inquiries aggregating 25,000 tons. The Westinghouse Electric & Mfg. Co. has an inquiry out for 3000 tons for its Cleveland plant for the third quarter and the American Radiator Co. is inquiring for 15,000 tons for its Detroit and Springfield plants. Steel making iron is inactive. Inquiry for low phosphorus iron has improved. Several inquiries, including one from the Pittsburgh district for 500 to 1000 tons for the last half, are pending. The Valley price has settled down to \$28, although this cannot meet the competition of prices prevailing in the East.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a \$3.02 freight rate from Jackson and \$6 rate from Birmingham:

Basic, Valley furnace.....	\$20.00 to \$21.00
N'th'n No. 2 fdy., sil. 1.75 to 2.25...	22.50 to 23.00
Southern fdy., sil. 1.75 to 2.25...	27.00
Malleable.....	22.50 to 23.00
Ohio silvery, 8 per cent.....	33.52
Stand. low phos., Valley furn....	28.00

Iron Ore.—Shipments of Lake Superior ore during May amounted to 6,583,815 tons, a decrease of 87,890 tons from May, 1923. The total movement to June 1 was 7,243,202 tons, an increase of 557,313 tons over the corresponding period last year when practically no ore was shipped in April.

Coke.—The demand for foundry coke is very light, foundries buying only car lots as needed. Prices are unchanged at \$4.75 to \$6 for standard Connellsville brands.

Bolts, Nuts and Rivets.—Bolt and nut makers report a fair volume of orders, but they are for very small lots. Leading makers appear to be holding well to regular discounts for the small lot business that is coming out. Rivets are quiet with no change in the price situation.

Semi-Finished Steel.—There is no new inquiry to test the market. Owing to reduced operations, sheet mills are still holding back on specifications for sheet bars.

Sheets.—The demand continues slow, but prices are holding close to recent levels. On black sheets, 3.50c. is still being quoted and there is a report not fully confirmed of a sale of 2000 tons of that price to a tank shop. Blue annealed sheets range from 2.75c. to 2.80c. and galvanized sheets at 4.75c. to 4.80c.

Reinforcing Bars.—Weakness has developed in billet steel reinforcing bars, which are being offered at 2.15c., Pittsburgh. Quotations on rail steel bars are unchanged at 2c. to 2.20c. The demand for small lots is heavy. Inquiries include 180 tons for a building for the W. S. Tyler Co., Cleveland.

Old Material.—A fair demand has developed from blast furnaces for borings and turnings, but mills are buying no steel making scrap. Purchases of machine shop turnings at \$12 and mixed borings and short turnings at \$13, were made by Cleveland consumers

during the week. Prices on these grades as well as on cast iron borings have advanced 50c. a ton. Busheling has advanced \$1 a ton but most other grades are unchanged although the market is firm. Yard dealers are buying considerable scrap for stock.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel.....	\$14.00 to \$14.25
Rails for rolling.....	15.50 to 16.00
Rails under 3 ft.....	16.25 to 16.75
Low phosphorus melting.....	16.50 to 16.75
Cast iron borings.....	12.50 to 12.75
Machine shop turnings.....	11.75 to 12.00
Mixed borings and short turnings	12.50 to 12.75
Compressed sheet steel.....	12.00 to 12.25
Railroad wrought.....	12.00 to 12.25
Railroad malleable.....	17.50 to 18.00
Light bundled sheet stampings..	11.50 to 12.00
Steel axle turnings.....	12.50 to 13.00
No. 1 cast.....	20.00 to 20.50
No. 1 busheling.....	11.25 to 11.75
Drop forge flashings.....	9.00 to 9.25
Railroad grate bars.....	13.25 to 13.50
Stove plate.....	13.25 to 13.50
Pipes and flues.....	9.25 to 9.50

Philadelphia

Large Increase in Pig Iron Buying and Steel Orders Are More Plentiful

PHILADELPHIA, June 3.—After many weeks of extreme dullness, the pig iron market has taken on greater activity, sales of more than 40,000 tons having been made within the week by eastern Pennsylvania furnaces. This business was taken, however, at the expense of prices. One lot of 21,000 tons sold to a radiator company for its New Jersey plant went at \$19.50, furnace, it is reported, and 30,000 tons sold to the same company at Buffalo was on a reported price basis of \$19 or less. Aside from the radiator company's orders, most of the Eastern business was in lots under 1000 tons. Deliveries are to be made through June and third quarter.

A slight improvement in the number of steel orders is another encouraging feature. While the actual net gain in tonnage is small, the week's buying has indicated that a greater number of consumers and jobbers are reaching that stage where replenishment, even in a small way, has become necessary. Eastern plate mills had the best week in some time. Prices of plates, shapes and bars show further weakness.

While the scrap market has shown no indications of quick recovery, there is a fairly strong undertone and advances have occurred whenever urgent demand has come from consumers. Melting steel scrap is held at \$15.50, but \$15 is the best offer that mills are making.

Pig Iron.—Upward of 40,000 tons of foundry iron, including one lot of 21,000 tons, has been sold within the past several days by furnaces in the eastern Pennsylvania district. The 21,000-ton lot was sold by a steel company to a radiator company for the latter's New Jersey plant, and the price is reported to have been \$19.50, furnace, for the base grade. It is reported here that the radiator company also bought 30,000 tons at Buffalo at \$19, or less. Other sales were mostly in lots of a few hundred tons each, few, if any, being more than 1000 tons. Practically all of the iron sold is for June and third quarter delivery. Prices were lowered in nearly every sale. One eastern Pennsylvania furnace decided to sell a limited tonnage at \$20.50 for No. 2 plain, \$21 for No. 2 X and \$21.50 for No. 1 X, f.o.b. furnace, and within a few days had disposed of 9000 tons. It then withdrew from the market by increasing its prices \$1 a ton. Another furnace sold about 5000 tons within the week at prices averaging about \$20.50, furnace, but in some instances made sales at \$20. Still another company sold several thousand tons but did not go below \$21, furnace. A part of the buying movement may be credited to the desire of consumers to lower the average cost of iron due them, as many consumers still have on order iron that was bought at prices higher than current quotations. Sales

of the week also included several thousand tons of low phosphorus iron. Despite the improved buying, the pig iron market is not materially stronger, as there are still some anxious sellers. Some furnaces are quoting prices above those at which sales were made in the past week, and hence did not share in the business. Imports of pig iron last week were 2500 tons from England, 1000 tons from France and 1000 tons from Calcutta, India.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76c. to \$1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$21.63 to \$22.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.13 to 22.63
East. Pa. No. 1X	22.63 to 23.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	30.17 to 31.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.67 to 31.67
Basic delivered eastern Pa.	21.00 to 21.50
Gray forge	22.00 to 22.50
Malleable	22.50 to 23.50
Standard low phos. (f.o.b. furnace)	24.00 to 25.00
Copper bearing low phos. (f.o.b. furnace)	24.00 to 25.00

Ore.—Iron ore imported last week totaled 13,300 tons, of which 7300 tons came from Chile and 6000 tons from Algeria. A thousand tons of manganese ore came from Calcutta, India.

Ferroalloys.—Consumers are getting ample shipments on contracts and consequently are not interested in further purchases. Very little business is being done. Ferromanganese prices are unchanged, \$107.50 being quoted by both domestic producers and importers.

Billets.—There is very little interest in semi-finished steel. Quotations on open-hearth rerolling billets continue at \$38, Pittsburgh, with a \$5 extra for forging billets.

Plates.—Eastern plate mills have had the best business in many weeks. Some of the orders placed were larger than have been common since the decline in prices began. The Baldwin Locomotive Works bought about 1400 tons for 40 Mexican locomotives and has about 400 tons still to buy. The Pennsylvania Railroad bought upward of 1000 tons and an iron works at Lancaster bought 1000 tons for tanks. Buyers apparently are convinced that prices are dragging bottom and there is a little less hesitancy in placing orders. For lots of a carload or more 2c., Pittsburgh, is commonly quoted, while less than carload lots are being taken at 2.10c. and 2.15c., Pittsburgh. On very large lots 2c. has been shaded. Eastern mills continue to operate at about 40 per cent of capacity. A decision is expected this week on 11,000 tons of car steel, mostly plates, inquired for by the Chesapeake & Ohio Railroad.

Structural Material.—Local fabricators are figuring on a slightly increased volume of prospective work. Most of this consists of small jobs, but there are indications of returning confidence in prices. Plans for the first section of the Philadelphia subways will probably be out for bids in a week or 10 days and will call for estimates on 9300 tons of steel. Eastern mills quote 2.10c. to 2.15c., Pittsburgh, on plain material. Pittsburgh mills are not meeting this competition in all instances. Importation of shapes is not as heavy as it was expected it might be, but small lots are coming in each week. Last week's receipts here were 145 tons, all from Belgium.

Bars.—The larger producers of steel bars have not been successful in holding to 2.25c., Pittsburgh, as a minimum on merchant steel and quotations of 2.20c. are now common. Bar iron is also slightly lower, quotations of 2.10c., Pittsburgh, being available from Eastern mills. Fifty tons of steel bars were received here last week from France.

Sheets.—The leading interest has notified some of its customers that it will meet the prices quoted by independents. These prices are generally \$4 a ton under the figures which were named by the leading interest for second quarter, being 2.80c. on blue annealed, 3.65c. on black and 4.80c. on galvanized, Pittsburgh base.

Warehouse Business.—Despite the continuance of a good deal of cutting by some of the local jobbers, quoted

prices on steel products out of stock remain unchanged. For local delivery, quotations are as follows:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.50c.; round edge steel, iron finished, 1½ x ¼ in., 3.50c.; round edge steel planished, 4.30c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ½ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 3.90c.; black sheets, No. 28 gage, 4.95c.; galvanized sheets, No. 28 gage, 6c.; square twisted and deformed steel bars, 3.47c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.30c.; ½-in., 5.50c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ½-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Old Material.—A deadlock between consumers and dealers on the question of prices to be paid for old material has prevented the consummation of much business in the past week. Most of the dealers and brokers feel that the market must advance, at least slightly, but consumers are slow to meet the price ideas of sellers. For example, two or three mills freely offer \$15 for No. 1 heavy melting steel, but the best offers that brokers will make is \$15.50 and that price would be only for small tonnages. Some advances have occurred on other grades, due principally to urgent needs of consumers. The situation in the market is such that further advances are almost bound to occur when urgent demand appears from any quarter. Several grades are 50c. higher than a week ago.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	\$15.00 to \$15.50
Scrap rails	15.00 to 15.50
Steel rails for rolling	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	19.00 to 20.00
Couplers and knuckles	18.50 to 19.00
Cast-iron car wheels	17.00 to 17.50
Rolled steel wheels	18.50 to 19.00
No. 1 railroad wrought	16.50 to 17.00
No. 1 yard wrought	16.00 to 16.50
No. 1 forge fire	13.00 to 13.50
Bundled sheets (for steel works)	12.50 to 13.00
Mixed borings and turnings (for blast furnace use)	11.00 to 11.50
Machine shop turnings (for steel works use)	12.00 to 12.50
Machine shop turnings (for rolling mill use)	12.00 to 12.50
Heavy axle turnings (or equivalent)	14.00 to 14.50
Cast borings (for steel works and rolling mills)	12.50 to 13.00
Cast borings (for chemical plants)	14.00 to 14.50
No. 1 cast	17.50 to 18.00
Heavy breakable cast (for steel plants)	15.50 to 16.00
Railroad grate bars	14.00 to 14.50
Stove plate (for steel plant use)	14.00 to 14.50
Wrought iron and soft steel pipes and tubes (new specifications)	15.00
Shafting	21.00 to 22.00
Steel axles	20.00 to 21.00

Recent promotions and transfers made by the Southwestern Portland Cement Co. are as follows. O. J. Binford, formerly secretary and superintendent of the company's plant at El Paso, Tex., has been transferred to Dayton, Ohio, where he will be secretary of the company and superintendent of the plant under construction. H. E. Nichols, formerly assistant superintendent at El Paso, has been appointed superintendent. H. T. Kiester, formerly purchasing agent at El Paso, has been transferred to the company's general offices at Los Angeles, Cal., and will act as general purchasing agent for the California and El Paso plants. R. L. Carter succeeds Mr. Kiester as resident purchasing agent at El Paso.

A Taft cotton gin and press, new patent, has been turned out under direction of the patentee at the plant of the Birmingham Machine & Foundry Co., Birmingham, Ala., and is on its way to Corpus Christi, Tex., where it will be further tried out. The press makes a round bale and does away with cotton ties, and reduces the round bale to smaller size than heretofore worked. Successful operation of the first press will mean a large number of others, molds having been preserved in this instance.

MORE IDLE STACKS

Net Loss of 29 Blast Furnaces in May in Pittsburgh District

May saw an even greater decrease in the number of blast furnaces in production than did April with its loss of 19 stacks in the Pittsburgh and nearby districts. During May, or between the period from April 29, to June 2, production ceased at 30 furnaces, while one furnace went into production, this being the stack of the Sharpsville Furnace Co., Sharpsville, Pa., which was blown in June 2, after a shutdown of several months. Pittsburgh district proper has lost 10 furnaces in the past month, the Mahoning and Shenango Valley district 14, while there has been a loss of 2 furnaces in Western Pennsylvania and 3 in the Wheeling district. Five of the furnaces which have gone out of production are of merchant classification, and as the one furnace which has resumed is of that class there is a net loss of only 4 among such furnaces.

Steel works active furnace decreases aggregated 25 to which the Carnegie Steel Co. has contributed 16; Youngstown Sheet & Tube Co., 3; American Steel & Wire Co., 2; Republic Iron & Steel Co., Trumbull Steel Co., Bethlehem Steel Co. (Cambria) and Wheeling Steel Corporation (La Belle) one each. As there were 114 furnaces in production at the end of March the loss of active furnaces over the past two months totals 48, and there are now 7 more furnaces out than in production. Record of the furnaces in and out of production as of June 2, and April 29, makes the following comparison:

Western Pennsylvania Steel Works Furnaces					
	Total	June 2, 1924		April 29, 1924	
		In	Out	In	Out
Bethlehem Steel Co., Johnstown, Pa.	11	5	6	6	5
Merchant Furnaces					
Adrian Furnace Co.	1	1	0	1	0
American Manganese Mfg. Co.	2	0	2	0	2
Kittanning Iron & Steel Mfg. Co.	1	0	1	0	1
McKinney Steel Co.					
Scottdale, Pa.	1	1	0	1	0
Josephine, Pa.	2	0	2	0	2
Perry Furnace Co.	1	0	1	0	1
Punxsutawney Furnace Co.	1	0	1	1	0
Total	20	7	13	9	11

HIGHER JAPANESE DUTIES

Reports Indicate Decided Advance of Rates on Sheets and Tin Plate

WASHINGTON, June 3.—Interest has been manifested by Department of Commerce officials in a recent press dispatch stating that revision of the Anglo-Japanese treaty of commerce and navigation doing away with the schedule of the conventional tariff has been completed in London, with the result that it will mean higher import duties on imports into Japan, and, among other things, will greatly raise duties on iron and steel products. The increase will apply to all countries exporting iron and steel into Japan and while the duties will be considerably higher they will not be discriminatory. They will all be on the same parity.

The provision of the treaty abrogated is known as article 8, which provided for preferential duties on iron and steel and other products exported from Great Britain into Japan. The same rates, however, were provided for American iron and steel producers under the "most favored nation" clause in the American-Japanese commercial treaty. The revision of the Anglo-Japanese treaty, according to the report, confirmation of which has been requested by the Iron and Steel Division, Department of Commerce, restores the general tariff schedule on all goods coming under

Pittsburgh District Steel Works Furnaces					
	Total	June 2, 1924		April 29, 1924	
		In	Out	In	Out
American Steel & Wire Co.					
Donora	2	1	1	2	0
Shoenberger	2	0	2	1	1
Carnegie Steel Co.					
Carrie	7	7	0	7	0
Clairton	3	1	2	2	1
Duquesne	6	2	4	4	2
Edgar Thomas	11	6	5	10	1
Edith	1	0	1	0	1
Isabella	3	2	1	2	1
Lucy	2	1	1	2	0
Neville	1	1	0	1	0
Jones & Laughlin Steel Corporation					
Alliquippa	5	4	1	4	1
Eliza	6	4	2	4	2
Soho	1	0	1	0	1
National Tube Co.	4	3	1	3	1
Pittsburgh Crucible Steel Co.	2	1	1	1	1
Pittsburgh Steel Co.	2	2	0	2	0
Merchant Furnaces					
Clinton Iron & Steel Co.	1	0	1	0	1
Total	59	35	24	45	14
Mahoning & Shenango Valley Districts Steel Works Furnaces					
Carnegie Steel Co.					
Farrell	3	1	2	2	1
New Castle	4	2	2	4	0
Niles	1	0	1	0	1
Ohio	6	2	4	5	1
Sharon	1	0	1	0	1
Republic Iron & Steel Co.	7	2	5	3	4
Sharon Steel Hoop Co.	1	1	0	1	0
Trumbull-Cliffs Furnace Co.	1	0	1	1	0
Youngstown Sheet & Tube Co.	9	3	6	6	3
Merchant Furnaces					
A. M. Byers Co.	1	0	1	1	0
Hanna Furnace Co.					
West Middlesex	1	0	1	0	1
Letonia, Ohio	1	1	0	1	0
Dover, Ohio	1	1	0	1	0
Reliance Coke & Furnace Co.					
West Middlesex, Pa.	1	0	1	0	1
Sharpsville, Pa.	1	1	0	1	0
McKeefrey Iron Co.	1	0	1	0	1
Sharpsville Furnace Co.	1	1	0	0	1
Shenango Furnace Co.	2	1	1	2	0
Struthers Furnace Co.	1	0	1	1	0
Stewart Furnace Co.	1	0	1	1	0
Valley Mold & Iron Corp.	1	0	1	0	1
Total	46	16	30	30	16
Wheeling District Steel Works Furnaces					
Carnegie Steel Co.					
Bellaire, Ohio	2	1	1	1	1
Mingo, Ohio	4	1	3	3	1
Steubenville, Ohio	1	0	1	0	1
National Tube Co.	2	2	0	2	0
Wheeling Steel Corporation	4	3	1	4	0
Weirton Steel Co.	1	1	0	1	0
Total	14	8	6	11	3
Grand Total	139	66	73	95	44

article 8, which includes iron and steel. It is claimed that the increase on black steel sheets, which were dutiable at 5.08 yen per ton, will be approximately six-fold under the general tariff, whose rate is 15 per cent ad valorem. At a market price of 200 yen per ton, or virtually \$100, a ton would be dutiable at 30 yen. The duty on tin plate, the report says, would be increased from 11.85 yen to 60 yen a ton and on galvanized sheets from 20 yen to 45 yen a ton.

In the absence of information to the contrary, the inclination here is to accept the report as being accurate and further details are being awaited with considerable interest. The supposition is that the higher rates have been decided upon in an effort to build up the Japanese tin plate and sheet industry, which at present is of small proportions. This is especially true in the case of sheets. While the higher rates would not affect the American iron and steel industry any more than the industry of any other country, belief prevails that Japan, being unable to supply her own sheet needs, and with but little better success in the case of tin plate, will get many protests from her own people who buy foreign material because of the much higher costs they will have to pay for their steel.

Steel erection on several large buildings in New York, held up for some weeks by a strike, now is progressing under police guard.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.20c. to 2.25c.

Structural Materials

Beams, channels, etc., base, per lb.....2.20c. to 2.25c.
Sheet piling2.30c. to 2.40c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.20c. to 2.25c.
Soft steel bars for cold finishing.....\$3 per ton over base
Reinforcing steel bars, base.....2.20c. to 2.25c.
Refined iron bars, base, per lb.....3c.
Double refined iron bars, base, per lb.....4.75c.
Stay bolt iron bars, base, per lb.....6.50c. to 7.00c.

Hot-Rolled Flats

Hoops, base, per lb.....2.75c.
Bands, base, per lb.....2.75c.
Strips, base, per lb.....2.50c. to 2.75c.

Cold-Finished Steel

Bars and shafting, base, per lb.....2.90c. to 3.00c.
Bars and shafting, l.c.l., per lb.....3.10c. to 3.25c.
Bars, S. A. E. Series, No. 2100.....4.75c.
Bars, S. A. E. Series, No. 2300.....6.25c.
Bars, S. A. E. Series, No. 3100.....5.25c.
Strips, base, per lb.....4.50c.

Wire Products

(To jobbers in car lots)

Nails, base, per keg.....\$2.90
Galvanized nails, 1 in. and over.....\$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....\$2.65
Annealed fence wire, base, per 100 lb.....2.80
Spring wire, base, per 100 lb.....3.70
Galvanized wire No. 9, base, per 100 lb.....3.25
Galvanized barbed, base, per 100 lb.....3.70
Galvanized staples, base, per keg.....3.70
Painted barbed wire, base, per 100 lb.....3.35
Polished staples, base, per keg.....3.35
Cement coated nails, base, per count keg.....2.40
Bale ties, carloads to jobbers.....75 and 5 per cent off list
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads,
60, 10 and 10 per cent off list
Carriage bolts, ½ x 6 in.:
Smaller and shorter, rolled threads,
60, 10 and 10 per cent off list
Carriage bolts, cut threads, all sizes.....60 and 10 per cent off list
Lag bolts65, 10 and 10 per cent off list
Flow bolts, Nos. 1, 2 and 3 heads.....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ½ x 4 in.,
50, 10 and 10 per cent off list
Larger and longer sizes.....50, 10 and 10 per cent off list
Hot pressed squares or hex. nuts, blank.....4.75c. to 5c. off list
Hot pressed nuts, tapped.....4.75c. to 5c. off list
C.p.c. and t. square or hex. nuts, blank.....4.25c. to 4.50c.
C.p.c. and t. square or hex. nuts, tapped.....4.25c. to 4.50c.
Semi-finished hex. nuts:
½ in. and smaller, U. S. S.....80, 10 and 5 per cent off list
¾ in. and larger, U. S. S.....75 and 10 per cent off list
Small sizes, S. A. E.....80, 10 and 5 per cent off list
S. A. E., ½ in. and larger.....75, 10 and 5 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10, 5 and 2½ per cent off list
Tire bolts.....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Bolt ends with cold pressed nuts.....50 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
55 and 5 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
70 and 10 per cent off list
Washers5.75c. to 6.00c.
Lock washers80 per cent off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

Per 1000			Per 1000		
1/4-in.	S. A. E.	U. S. S.	1/4-in.	S. A. E.	U. S. S.
.....	\$4.25	\$4.25	1/2-in.	\$13.25	\$13.50
3/8-in.	4.90	4.90	3/4-in.	16.25	16.50
1/2-in.	5.90	6.25	1-in.	22.50	23.00
3/4-in.	7.50	8.50	1 1/4-in.	34.00	34.00
1-in.	9.75	10.00	1 1/2-in.	53.00	55.00

Larger sizes—Prices on application.

Cap and Set Screws

Milled hex. head cap screws.....75, 10 and 5 per cent off list
Milled standard set screws, case hardened,
75, 10 and 5 per cent off list
Milled headless set screws, cut thread,
75, 10 and 5 per cent off list
Upset hex. head cap screws, U. S. S. thread,
80, 10 and 10 per cent off list
Upset hex. head cap screws, S. A. E. thread,
80, 10 and 10 per cent off list
Milled studs65 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....\$2.65 to \$2.75
Small rivets70 and 10 per cent off list

Track Equipment

Spikes, ½ in. and larger, base, per 100 lb.....\$2.90 to \$3.00
Spikes, ½ in. and smaller, base, per 100 lb.....3.25 to 3.40
Spikes, boat and barge, base, per 100 lb.....3.25 to 3.40
Track bolts, all sizes, base, per 100 lb.....3.75 to 4.25
Tie plates, per 100 lb.....2.50 to 2.55
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Butt Weld			Iron		
Inches	Steel	Galv.	Inches	Black	Galv.
1/4	45	19 1/2	1/4 to 3/8	+11	+39
1/2	51	25 1/2	1/2	22	2
3/4	56	42 1/2	3/4	28	11
1	60	48 1/2	1 to 1 1/2	30	13
1 to 3	62	50 1/2			
2	55	43 1/2	Lap Weld		
2 1/2 to 6	59	47 1/2	2	23	7
7 and 8	56	43 1/2	2 1/2	26	11
9 and 10	54	41 1/2	3 to 6	28	13
11 and 12	53	40 1/2	7 to 12	26	11
Butt Weld, extra strong, plain ends					
1/4	41	24 1/2	2 to 3	61	50 1/2
1/2 to 3/8	47	30 1/2	1/2 to 3/8	+19	+54
1/2	53	42 1/2	1/2	21	7
3/4	58	47 1/2	3/4	28	12
1 to 1 1/2	60	49 1/2	1 to 1 1/2	30	14
Lap Weld, extra strong, plain ends					
2	53	42	2	23	9
2 1/2 to 4	57	46 1/2	2 1/2 to 4	29	15
4 1/2 to 6	56	45 1/2	4 1/2 to 6	28	14
7 to 8	52	39 1/2	7 to 8	21	7
9 and 10	45	32 1/2	9 to 12	16	2
11 and 12	44	31 1/2			

To the large jobbing trade the above discounts are increased by one point, with supplementary discount of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		Charcoal Iron	
2 to 2 1/4 in.	27	1 1/2 in.	+18
2 1/4 to 2 3/4 in.	37	1 3/4 to 1 7/8 in.	+8
3 in.	40	2 to 2 1/4 in.	+2
3 1/4 to 3 3/4 in.	42 1/2	2 1/4 to 3 in.	7
4 to 13 in.	46	3 1/4 to 4 1/2 in.	9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn		Hot Rolled	
1 in.	55	3 and 3 1/4 in.	36
1 1/4 and 1 1/2 in.	47	3 1/2 and 3 3/4 in.	37
1 3/4 in.	31	4 in.	41
2 and 2 1/4 in.	22	4 1/2 in. and 5 in.	33
2 1/2 and 2 3/4 in.	32		
3 and 3 1/4 in.	38	4 in.	43
3 1/2 in. and 3 3/4 in.	39		

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage....	15	2 1/4-in. O.D. 10 gage....	20
2-in. O.D. 11 gage....	16	3-in. O.D. 7 gage....	35
2-in. O.D. 10 gage....	17	1 1/2-in. O.D. 9 gage....	15
2 1/4-in. O.D. 12 gage....	17	5 1/2-in. O.D. 9 gage....	55
2 1/4-in. O.D. 11 gage....	18	5 1/2-in. O.D. 9 gage....	57

Tin Plate

Standard cokes, per base box.....\$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base.....\$11.00	20-lb. coating I. C.....\$14.90
8-lb. coating I. C.....11.30	25-lb. coating I. C.....16.20
12-lb. coating I. C.....12.70	30-lb. coating I. C.....17.35
15-lb. coating I. C.....13.95	35-lb. coating I. C.....18.35
	40-lb. coating I. C.....19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.80c. to 3c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.50c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb., 5.10c.

Galvanized

No. 28 (base), per lb.....4.75c. to 5c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.75c. to 3.95c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron.....	\$5.65
Old range non-Bessemer, 51½ per cent iron.....	4.90
Mesabi Bessemer, 55 per cent iron.....	5.40
Mesabi non-Bessemer, 51½ per cent iron.....	4.75

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian.....	9.75c.
Iron ore, Swedish, average 66 per cent iron.....	9.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal.....	45c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus.....	42c.
Manganese ore, Brazilian or Indian, nominal.....	42c.
Tungsten ore, per unit, in 60 per cent concentrates.....	\$3.75 to \$10.00
Chrome ore, basic, 48 per cent Cr ₂ O ₃ , crude, per ton, c.i.f. Atlantic seaboard.....	19.00 to 22.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₃ , New York.....	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton.....	\$107.50
Ferromanganese, British, 80 per cent f.o.b. Atlantic port, duty paid.....	107.50
Ferrosilicon, 50 per cent, delivered.....	75.00
Ferrosilicon, 75 per cent.....	140.00
Ferrotungsten, per lb. contained metal.....	90c. to 93c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered.....	10.75c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr. per lb.....	10.50c.
Ferrovanadium, per lb. contained vanadium.....	\$3.50 to \$4.00
Ferrocobalt, 15 to 18 per cent, per net ton.....	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent.....	\$35.00 to \$37.00
Spiegeleisen, domestic, 16 to 19 per cent.....	34.00 to 36.00
Ferrosilicon, Bessemer, 10 per cent, \$39.50; 11 per cent, \$42, 12 per cent, \$43.50; 14 to 16 per cent (electric furnace), \$40.00.	
Silvery iron, 5 per cent, \$27.00; 6 per cent, \$28.00; 7 per cent, \$29.00; 8 per cent, \$30.50; 9 per cent, \$32.50; 10 per cent, \$34.50; 11 per cent, \$37.00; 12 per cent, \$39.50.	

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines.....	\$20.00 to \$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines.....	22.00 to 23.50
Per 1000 f.o.b. works:	
Fire Clay:	
Pennsylvania.....	\$40.00 to \$45.00
Maryland.....	45.00 to 47.00
Ohio.....	40.00 to 43.00
Kentucky.....	42.00 to 43.00
Illinois.....	37.00 to 42.00
Missouri.....	42.00 to 45.00
Ground fire clay, per net ton.....	6.00 to 7.00
Silica Brick:	
Pennsylvania.....	38.00
Chicago.....	47.00
Birmingham.....	50.00
Ground silica clay, per net ton.....	7.50 to 8.00
Magnesite Brick:	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.).....	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.).....	40.00
Chrome Brick:	
Standard size, per net ton.....	47.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over.....	\$38.00
Rolling billets, 2-in. and under.....	33.00
Forging billets, ordinary carbons.....	43.00
Sheet bars, Bessemer.....	40.00
Sheet bars, open-hearth.....	40.00
Slabs.....	34.00
Wire rods, common soft, base, No. 5 to ¼-in.....	\$48.00 to 49.00
Wire rods, common soft, coarser than ¼-in.....	\$2.50 over base
Wire rods, screw stock.....	\$5.00 per ton over base
Wire rods, carbon, 0.20 to 0.40.....	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55.....	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75.....	7.50 per ton over base
Wire rods, carbon over 0.75.....	10.00 per ton over base
Wire rods, acid.....	15.00 per ton over base
Skelp, grooved, per lb.....	2.20c. to 2.25c.
Skelp, sheared, per lb.....	2.20c. to 2.25c.
Skelp, universal, per lb.....	2.20c. to 2.25c.

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton.....	\$43.00
Rails, light, new steel, base, lb.....	1.90c. to 2.00c.
Rails, light, rail steel, base, per lb.....	1.85c. to 1.90c.
Bars, common iron, base, per lb., Chicago mill.....	2.30c.
Bars, common iron, Pittsburgh mill.....	2.40c.
Bars, rail steel reinforcing, base, per lb.....	2.10c. to 2.15c.
Rail steel bars, base, per lb., Chicago mill.....	2.20c.
Cold-finished steel bars, base, Chicago, per lb.....	2.90c. to 3c.
Ground shafting, base, per lb.....	3.40c.
Cut nails, base, per keg.....	\$3.00 to \$3.10

Alloy Steel

S. A. E. Series Numbers	Bars 100 lb.
2100* (¼% Nickel, 10 to 20 per cent Carbon)...	\$3.50
2300 (¾% Nickel).....	5.00
2500 (5% Nickel).....	\$6.50 to 7.00
3100 (Nickel Chromium).....	4.00
3200 (Nickel Chromium).....	5.75 to 6.00
3300 (Nickel Chromium).....	8.00 to 8.25
3400 (Nickel Chromium).....	7.00 to 7.25
5100 (Chromium Steel).....	3.75
5200* (Chromium Steel).....	7.50 to 8.00
6100 (Chromium Vanadium bars).....	4.75 to 5.00
6100 (Chromium Vanadium spring steel).....	4.50 to 4.75
9250 (Silicon Manganese spring steel).....	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium).....	4.75
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum).....	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum).....	4.25
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum).....	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are \$10 per gross ton less than net ton prices for bars of same analysis. On smaller than 4 x 4-in. billets the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, carload lots, 36,000 lb. minimum carload, per 100 lb.:

Philadelphia, domestic.....	\$0.32	Buffalo.....	\$0.265	St. Louis.....	\$0.43	*Pacific Coast.....	\$1.15
Philadelphia, export.....	0.235	Cleveland.....	0.215	Kansas City.....	0.735	*Pac. Coast, ship plates 1.20	
Baltimore, domestic.....	0.31	Cleveland, Youngstown.....	0.19	Kansas City (pipe).....	0.705	Birmingham.....	0.58
Baltimore, export.....	0.225	Comb.....	0.29	St. Paul.....	0.60	Memphis.....	0.56
New York, domestic.....	0.34	Detroit.....	0.29	Omaha.....	0.735	Jacksonville, all rail.....	0.70
New York, export.....	0.255	Cincinnati.....	0.29	Omaha.....	0.705	Jacksonville, rail and water.....	0.415
Boston, domestic.....	0.365	Indianapolis.....	0.31	*Denver.....	1.15	New Orleans.....	0.67
Boston, export.....	0.255	Chicago.....	0.34	†Denver (pipe).....	1.17		

*Applies minimum carload 80,000 lb. †Minimum loading 46,000 lb.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingots and muck bars, structural steel, common wire products, including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 36,000 lb.

FABRICATED STEEL BUSINESS

Structural Awards and Inquiries Continue on a Diminished Scale

Awards of projects requiring fabricated steel, as reported to THE IRON AGE, totaled close to 19,000 tons for the past week. Inquiries make a smaller total, about 13,000 tons. Roughly, this is about 50 per cent of the volume of such work that was reported each week during the period of greatest activity in the first quarter of the year. The largest job awarded was a railroad bridge at Cleveland, requiring 4000 tons, while a gas holder to be erected at Memphis, Tenn., will take 3000 tons. The largest inquiry reported is from the Standard Oil Co. of Louisiana, 3600 tons for oil tanks. Awards include:

Susquehanna River bridge at Milton, Pa., 850 tons, to Bethlehem Steel Co.

U. S. Metals Refining Co., plant at Carteret, N. J., 1600 tons, to Pittsburgh Bridge Co.

Fall River, Mass., highway bridge, 225 tons; T. F. Phelan, Fall River, low bidder.

Dupont Co., power plant addition at Passaic, N. J., 200 tons, to McClintic-Marshall Co.

Interstate Park, Trenton, N. J., grandstand, 300 tons, to American Bridge Co.

Central Railroad of New Jersey, bridge at Somerville, N. J., 1000 tons, to Bethlehem Steel Co.

Department of Street Cleaning, City of New York, housing station at 139th Street and Harlem River, 1950 tons, to A. E. Norton, Inc.

Loft building, 22 East Forty-eighth Street, New York, 850 tons, to A. E. Norton, Inc.

Weave mill, High Shoals, N. C., 276 tons, to McClintic-Marshall Co.

Furnace Brook, Mass., bridge, 183 tons, to Boston Bridge Works.

High school, Dunkirk, N. Y., 450 tons, to Kellogg Structural Steel Co.

Kenyon Theater, Pittsburgh, North Side, 125 tons, to Fort Pitt Bridge Works.

Gas holder, Memphis, Tenn., 3000 tons, to Riter-Conley Co.

Westminster Building, Dayton, Ohio, 425 tons, to Massillon Structural & Bridge Co.

Humble Oil Co., 5 80,000-bbl. tanks for Texas, 1600 tons, to Chicago Bridge & Iron Works.

Phoenix Utility Co., plant, Phoenix, Ariz., 500 tons, to Mississippi Valley Structural Steel Co.

Terminal Railroad Association of St. Louis, repairs to Eads bridge, St. Louis, 342 tons, to Mississippi Valley Structural Steel Co.

City of Corpus Christi, Tex., bascule bridge, 820 tons, to Wisconsin Bridge & Iron Co. instead of 500 tons, as reported last week.

American Stove & Enameling Co., building, Harvey, Ill., 237 tons, to Kenwood Bridge Co.

Memorial building and City Hall for city of Chanute, Kan., 196 tons, to unnamed fabricator.

Junior high school, Rhinelander, Wis., 184 tons, to unnamed fabricator.

Pennsylvania Railroad grade crossing bridges, Cleveland, 4000 tons, to McClintic-Marshall Co.

Logan Dock Co., Huntington, W. Va., bridge, 125 tons, to American Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Delaware River Bridge Commission, anchorage piers for Philadelphia-Camden bridge, 1800 tons; erroneously mentioned last week as steel for the approaches. The approaches will require about 20,000 tons and bids have not yet been asked for. Bids on the anchorage piers close June 18.

American League baseball park, Philadelphia, grandstand alterations, 800 tons.

Asbury Park, N. J., high school building, 400 tons.

Chester, Vt., highway overpass, 142 tons.

Stockton, Cal., auditorium, 600 tons.

S. M. Byllesby & Co., Chicago, power plant at North Bend, Ore., 1000 tons.

Sioux City, Iowa, power plant, 1200 tons.

Anaconda Copper Co., power plant, Great Falls, Mont., 600 tons.

Swift & Co., Union Stock Yards, Chicago, plant building, 1900 tons.

Masonic Memorial Temple, Thirty-fifth Street and Drexel Boulevard, Chicago, 900 tons.

Becklenberg Theater, Chicago, 450 tons.

Nugent Brothers Dry Goods Co., store building, St. Louis, 1000 tons, bids being taken by Wimmer Contracting Co., St. Louis.

Grand Trunk Railroad, shops at Battle Creek, Mich., 235 tons.

City of Corpus Christi, Tex., wharf and transfer shed, 700 tons, general contract awarded to Sumner-Sollitt Co., Chicago and San Antonio.

Standard Oil Co. of Louisiana, tanks for Baton Rouge, 3600 tons.

Citizens National Bank building, Mansfield, Ohio, 500 tons, bids taken.

Citizens Title & Trust Co., Uniontown, Pa., 200 tons.

Railroad Equipment Buying

Locomotives in need of repair on May 15 totaled 11,866 or 18.4 per cent of the number on line, according to the car service division of the American Railway Association. This was an increase of 426 locomotives compared with the number in need of repair on May 1.

The Richmond, Fredericksburg & Potomac has placed 3 express cars and 2 coaches with the American Car & Foundry Co.

The Delaware, Lackawanna & Western is inquiring for 50 suburban coaches and 10 suburban passenger baggage cars.

SAAR IRON INDUSTRY PRECARIOUS

Railroad Transportation Problems Acute and Traffic Dislocated—Seeking New Market Outlets

BERLIN, GERMANY, May 15.—The position of the iron industry in the Saar district, which is under French supervision, has become uncertain. As with Alsace-Lorraine, the Saar has the privilege of importing duty free into Germany until 1925, but it also has suffered heavily through the occupation of the Ruhr and the stoppage and dislocation of railroad traffic that took place. The direct road to unoccupied Germany, its main market, being blocked, it has sent its goods via Alsace-Lorraine. Here the railroad was unable to cope with the additional burden and transit often was delayed considerably.

Up to recently Saar goods in large part still were going through Alsace-Lorraine, but the German Government has decided that they have to enter Germany by the German Saar frontier, a measure which makes Saar competition in the German market more difficult, as it increases transport costs. Manufacturers approached the German Government and goods carried by a certain Alsace-Lorraine line are permitted to enter this country.

Finding New Markets

Saar competition in the German market has become difficult. Prices are higher than in Germany and, if the franc should remain at its present exchange rate, an improvement seems impossible. Before 1914 the production of the district was absorbed mainly by the German market, but now the industry depends greatly on export. The opening up of new markets abroad has not met with sufficient success. During the time of the decline of the franc manufacturers had their order books filled, but a change has taken place since then. Some large orders have been secured from Denmark and South and Central America, but the unfavorable position of the Saar district in regard to railroad freightage makes business difficult for export to the Eastern border states, Russia, the Balkans, etc. In the countries more closely situated, as Holland, Great Britain, etc., competition is strong and the industry has to devote its energies more to the outer European markets.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin (Spot)		Lead		Zinc	
	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis	
May								
28.....	12.87½	12.50	41.50	6.90	6.75	6.15	5.80	
29.....	12.87½	12.50	40.75	6.95	6.80	6.15	5.80	
31.....	12.87½	12.50	....	6.95	6.85	6.15	5.80	
June 2...	12.87½	12.50	40.95	6.95	6.90	6.15	5.80	
3.....	12.87½	12.50	40.75	7.00	6.95	6.15	5.80	

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, June 3.

The markets are all quiet and the inactivity has been intensified by the Memorial Day holidays. Copper is in light demand but firm. The tin market is moderately active and steady. Demand for lead has improved and a little buying of zinc has caused prices to advance.

Copper.—There has been a slight improvement in inquiry and buying of electrolytic copper, but it has been only about enough to keep prices from sagging. A few consumers have bought small quantities and there have been a few sales for export. While some producers have a minimum asking price of 12.87½c., delivered, there is enough metal at 12.75c. to satisfy a part of the demand. The recent curtailment in production is believed to have just about offset the lessened consumption, so that the statistics for May are not likely to show much improvement over those of the month previous, so far as influencing the market toward higher levels is concerned. Lake copper is quoted at 12.87½c. to 13c., delivered.

Copper Averages.—The average price of Lake copper for the month of May, based on daily quotations in THE IRON AGE, was 13.17c., delivered. The average price of electrolytic copper was 13.01c., delivered, or 12.76c., refinery.

Tin.—The market has been a quiet one, with small sales aggregating about 500 tons for the week ending Thursday, May 29. Because of the holiday very little business has been transacted and even yesterday only about 50 tons of spot metal was sold at prices ranging from 40.87½c. to 41c. Consumers are still largely absent from the market, the trading being confined to dealers. The deliveries into consumption for May were 5240 tons and the amount in stock on May 31 was 1567 tons, with 2500 tons landing. The deliveries were below expectations and are regarded as indicating an increase in the visible supply for the world of 1500 to 2000 tons. Spot Straits tin was quoted today, New York, at 40.75c. Quotations today in London were about £1 per ton higher than a week ago at £209 12s. 6d. for spot standard, £208 17s. 6d. for future standard and £213 2s. 6d. for spot Straits.

Lead.—Demand for lead has increased and a fairly good business is reported. The result has been a stiffening in prices in the outside market so that for the first time in many weeks they are tending higher than the quotation of the leading interest which remains unchanged at 7c., New York. Lead for future shipment in July or August has sold at 7c., delivered in the East. The St. Louis market has stiffened decidedly and quotations are close to the Eastern price at around 6.95c., St. Louis.

Zinc.—The market for prime Western zinc has improved somewhat, due partly to buying by operators, together with a moderate amount of consuming demand. Quotations stand at 5.80c., St. Louis, or 6.15c., New York.

Nickel.—Quotations for shot and ingot nickel are unchanged at 27c. to 32c. per lb. with electrolytic nickel held at 30c. to 32c. by the leading producers. Shot and ingot nickel in the outside market are quoted at 28c. to 32c. per lb.

Antimony.—Chinese metal in wholesale lots is

quoted at 8.50c., duty paid, New York, for spot and early delivery.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 27c. to 28c. per lb., duty paid, delivered.

Old Metals.—The market is uncertain and business is slow. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	12.25
Copper, heavy and wire.....	11.25
Copper, light and bottoms.....	10.25
Heavy machine composition.....	10.00
Brass, heavy.....	7.75
Brass, light.....	6.50
No. 1 red brass or composition turnings.....	8.50
No. 1 yellow rod brass turnings.....	7.25
Lead, heavy.....	6.00
Lead, tea.....	5.00
Zinc.....	4.25
Cast aluminum.....	16.00
Sheet aluminum.....	16.50

Chicago

JUNE 3.—Lead has advanced following liberal buying for both spot and future delivery. Consumers evidently came into the market in the belief that prices had reached bottom. Tin, on the other hand, has declined, while copper, zinc and antimony remain unchanged. Among the old metals, grades of copper, brass, lead and zinc have advanced. We quote in carload lots: Lake copper, 13.25c.; tin, 41.50c.; lead, 6.85c.; spelter, 5.70c.; antimony, 10.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.25c.; copper bottoms, 8.75c.; red brass, 7.50c.; yellow brass, 6.25c.; lead pipe, 5.75c.; zinc, 3.75c.; pewter, No. 1, 20c.; tin foil, 26c.; block tin, 30c.; all buying prices for less than carload lots.

Refractories Prices Hold Better in the West Than in the East

PITTSBURGH, June 2.—While Western makers of clay fire and silica brick are well provided with business and for that reason firm in their price ideas, the reverse appears to be the case with Eastern manufacturers. Blast furnace construction, rebuilding and relining work is much heavier West than East and some Kentucky producers of clay fire brick are solidly booked against production over the next six months and there is so much coke oven construction in progress in the West that the attendant demand for silica brick has enabled Western producers to ignore the price reduction made by Eastern companies. With Eastern business in both grades of moderate compass and with a good many makers seeking a share, the price situation is anything but strong and it is doubtful whether the public quotations apply on much of the passing business. Prices are given on page 1687.

Slight Decline in Employment in Iron and Steel Plants

WASHINGTON, June 3.—Showing a decline of 0.6 per cent, employees in 209 establishments in the iron and steel industry in April totaled 278,911 as against 280,553 in March. The payroll in April, amounting to \$8,487,343, showed a decline of 2.6 per cent under March, when the payroll totaled \$8,715,398. Employment in the iron and steel industry in April this year in 164 plants, when there were 235,287 on the payroll, showed an increase of 8.7 per cent over April of last year, when the number of employees in these plants was 216,542. The payroll in April of this year in these establishments totaled \$7,052,586, an increase of 17.5 per cent over April of last year, when the total was \$6,300,560. Of 106 iron and steel plants reporting, 12 per cent were idle in April, 50 per cent were operating fully, and 38 per cent were operating part time, according to a report of the Department of Labor.

PERSONAL

Arthur H. Young, for the last six years manager of industrial relations for the International Harvester Co., has resigned that post to become industrial relations counsel to the New York law firm of Curtis, Fosdick & Belknap, personal attorneys of John D. Rockefeller, Jr. Mr. Young was closely associated with the authorship of the widely known Harvester Industrial Council Plan, adopted in 1919, and has been chiefly responsible for its administration in the company's score or more of manufacturing and raw materials operations in the United States and Canada.

A long and varied experience, covering both sides of industrial relations, specially fitted him for that task and for the greater one which he now undertakes. As a boy and during the earlier years of his young manhood he was a steel worker in the mills of Joliet, Ill., and Colorado. In 1916 he became supervisor of labor and safety at the South Chicago plant of the Illinois Steel Co., and in 1917 was chosen director of the American Museum of Safety. During the war he was chief safety expert in charge of that work at all arsenals and navy yards. During 1921-22 he was president of the National Safety Council. Mr. Young's new home will be in Montclair, N. J., and his office will be in the Woolworth Building, New York.

Cyrus McCormick, Jr., vice-president, International Harvester Co., in announcing Mr. Young's resignation, said in part: "With a great deal of regret I announce the resignation from the service of this company, effective June 1, of A. H. Young, manager of the industrial relations department. While I share with the rest of the organization a keen regret at Mr. Young's departure, I have gladly consented to his going, because I feel that in making this sacrifice the company is increasing its contribution to the well-being of industrial relations in its broadest aspect."

Mr. Young's place will be taken by George J. Kelday, at present one of the two assistants to the manager of the industrial relations department. George Hodge is appointed assistant manager.

M. D. Church has been appointed general manager of the Moore Steam Turbine Corporation, Wellsville, N. Y. Mr. Church has spent practically his entire life in steam turbine work. Graduating from Syracuse University in 1906, he was later in the employ of the Kerr Turbine Co. for six years, during which time he served as assistant chief engineer and factory superintendent under the late J. L. Moore. For the last nine years Mr. Church has acted as chief engineer for the Terry Steam Turbine Co. Mr. Church is a member of the A. S. M. E., he is serving on the power test code committee of the steam turbine division. He is also a member of the A. E. S. C. committee of standardization of gears and chairman of the subcommittee of ratings of gears.

H. M. Lane of the H. M. Lane Co., foundry engineer, Detroit, will deliver an address before the Chicago Foundrymen's Club at the City Club, Chicago, Monday evening, June 9. His subject will be, "A Comparison of European with American Foundry Methods."

Kenneth C. Plasterer, formerly production manager in the gasoline motor department, Midwest Engine Co., Indianapolis, has joined the Stoughton Wagon Co., Stoughton, Wis., as manager of gas engine production. W. C. Buser, formerly assistant sales and service manager at Indianapolis, also has joined the Stoughton company's staff.

Arthur H. Hall has been appointed sales manager of the Hendey Machine Co., Torrington, Conn., manufacturer of lathes, shapers and milling machines, effective June 1. He has been connected with the Hendey company for more than 28 years, in fact he has never worked for any other company. He has been district sales manager in New York for the past

nine years and before that, held the same position in Chicago. Prior to that time, he traveled for the Hendey company for many years as special representative.

Arthur F. Woodford, secretary Sessions Foundry Co., Bristol Conn., has been made a director of the Bristol Chamber of Commerce.

E. S. Evans, president E. S. Evans & Co. of Detroit, has been appointed vice-president of the Bassick-Alemite Corporation in charge of sales of all units of the corporation, including both the Bassick Mfg. Co. of Chicago, manufacturer of high-pressure lubricating systems, and the Allyn-Zerk Co., the most recent acquisition of the Bassick-Alemite Corporation. Mr. Evans is an authority on the loading of automobiles for shipment, having been called to Washington in 1918 to formulate rules for the United States Army.

Ralph G. Farrell, president and general manager Bridgeport Screw Co., Bridgeport, Conn., will return next week from a three months business tour of Europe.

R. Armstrong has left the Canadian Steel Foundries, Ltd., to take up his new duties with the Canadian Brake Shoe & Foundry Co., Ltd., Sherbrooke, Quebec, as superintendent.

D. A. Currie, vice-president and general manager Erie Foundry Co., Erie, Pa., will sail for Europe on the Leviathan, leaving New York June 14. He is going in particular to confer regarding additional drop hammers and trimming presses which the company is furnishing a French automobile manufacturer and will also spend some time in England.

Obituary

DAVID BLYMER, formerly president of the Blymer Iron Works and the Blymer Ice Machine Co., Cincinnati, died at Battle Creek, Mich., May 23, aged 86. Mr. Blymer had made his home in Evansville, Ind., since 1888.

ALBERT THORNE, aged 38 years, cashier of the General Electric Co., Schenectady, N. Y., was killed in an automobile accident at Cincinnati on the night of May 29. He was on a business trip to Cincinnati at the time of the accident.

ALVES N. WEBB, president Progress Stove Co., Louisville, Ky., was killed in an automobile accident at Holton, Ind., May 23, while returning to Louisville after a tour through the East. Mrs. Webb, their son, Brent G. Webb, architect, and his wife, also were killed.

EDWIN C. NICHOLS, president Nichols-Shepard Thresher Co., Battle Creek, Mich., died of a sudden heart attack on May 27, aged 85 years. He was long prominent in Michigan industry and was formerly mayor of Battle Creek. In 1910 he assisted in re-writing the Michigan constitution.

ARTHUR O. HUBBARD, president Puffer-Hubbard Mfg. Co., Minneapolis, died May 13.

Comprehensive Tramrail System Catalog

The wide application and the items of equipment employed in the Cleveland electric tramrail system of handling materials are described in detail in a catalog of more than 200 pages, 8½ x 11 in., recently issued by the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

Numerous illustrations show the use of the apparatus in foundries, wire mills, machine shops, dipping and painting departments and other places. Component elements of the system, including the rail and its method of support, switches, carriers, cranes, transfer bridges, lifts, buckets, grabs, scales, chip collecting carriers and magnets, and numerous other items are also illustrated and described and line drawings, engineering data are included. The catalog is in effect an encyclopedia of this class of materials handling equipment.

A feature of the system is that standardization has largely eliminated the engineering required to layout and make the installation. Lengths of rail and fittings as required are available and there is a fitting to meet every condition.

Steel Making in United States Last Year

Production of Ingots and Castings, Finished Forms of Rolled Iron
and Steel and Miscellaneous Products Shown in Compilation

by American Iron and Steel Institute

PRODUCTION OF STEEL-INGOTS AND CASTINGS.

PRODUCTION OF STEEL INGOTS AND CASTINGS BY PROCESSES.

Years	Open-hearth.			Bessemer.	Cru- cible.	Elec- tric.	Mis- cella- neous.	Total. Gross Tons.
	Basic.	Acid.	Total.					
1909	13,417,472	1,076,464	14,493,936	9,330,783	107,355	13,762	9,185	23,955,021
1910	15,292,329	1,212,180	16,504,509	9,412,772	122,303	52,141	3,194	26,094,919
1911	14,685,932	912,718	15,598,650	7,947,854	97,653	29,105	2,844	23,676,106
1912	19,641,502	1,139,221	20,780,723	10,327,901	121,517	18,309	2,853	31,251,303
1913	20,344,626	1,255,305	21,599,931	9,545,706	121,226	30,180	3,831	31,300,874
1914	16,271,129	908,555	17,179,684	6,220,846	89,869	24,009	3,622	23,513,030
1915	22,308,725	1,370,377	23,679,102	8,287,213	113,782	69,412	1,527	32,151,036
1916	29,616,658	1,796,769	31,413,427	11,059,039	129,692	108,916	604	42,773,680
1917	32,087,607	2,061,386	34,148,993	10,479,960	126,716	304,543	495	45,060,607
1918	32,476,571	1,982,820	34,459,391	9,376,236	115,112	511,364	329	44,462,432
1919	25,719,312	1,229,382	26,948,694	7,271,562	63,572	384,452	2,952	34,671,232
1920	31,375,723	1,296,172	32,671,895	8,883,067	72,265	502,152	3,535	42,132,934
1921	15,082,564	507,238	15,589,802	4,015,938	7,613	169,499	945	19,783,797
1922	28,387,171	921,812	29,308,983	5,919,298	28,606	346,030	35	35,602,926
1923	34,665,021	1,234,636	35,899,657	8,484,088	44,079	515,872	44	44,943,690

PRODUCTION OF STEEL INGOTS.

1909	13,111,467	781,429	13,892,896	9,296,969	94,672	13,456	786	23,298,779
1910	14,858,353	782,805	15,641,158	9,330,437	107,671	50,821	25	25,154,087
1911	14,419,306	608,153	15,027,459	7,890,753	83,623	27,227	417	23,029,479
1912	19,197,504	712,371	19,909,875	10,259,151	100,967	14,147	542	30,284,682
1913	19,884,465	805,250	20,689,715	9,465,200	103,655	20,973	587	30,280,130
1914	15,936,986	633,382	16,570,367	6,154,964	78,693	15,458	312	22,819,784
1915	21,975,622	968,148	22,943,770	8,194,737	99,026	46,346	331	31,284,212
1916	29,011,146	1,227,832	30,238,978	10,916,248	120,341	126,046	302	41,401,917
1917	31,528,939	1,406,796	32,935,737	10,320,688	122,882	239,632	261	43,619,200
1918	31,970,691	1,347,670	33,318,361	9,215,392	113,782	403,068	219	43,051,022
1919	25,405,047	780,827	26,186,174	7,172,743	62,563	272,942	373	33,694,795
1920	30,926,393	769,102	31,695,495	8,778,107	70,536	346,956	298	40,881,392
1921	14,864,607	290,780	15,155,387	3,977,129	6,877	84,404	317	19,224,084
1922	27,961,190	517,045	28,478,235	5,871,565	27,561	191,057	34	34,568,418
1923	34,093,711	653,337	34,747,048	8,416,576	42,127	279,914	13	43,485,665

PRODUCTION OF STEEL CASTINGS.

1909	306,005	295,035	601,040	33,814	12,683	308	8,309	656,242
1910	433,976	429,375	863,351	58,335	14,632	1,320	3,194	940,832
1911	266,626	304,565	571,191	57,101	14,030	1,878	2,427	646,627
1912	443,996	426,850	870,846	68,750	20,550	4,162	2,311	966,621
1913	460,161	450,055	910,216	80,506	17,571	9,207	3,244	1,020,744
1914	334,144	270,173	604,317	65,882	11,186	8,551	3,310	693,246
1915	333,103	402,229	735,332	92,476	14,756	23,064	1,196	866,824
1916	605,512	570,937	1,176,449	142,791	9,351	42,870	302	1,371,763
1917	558,568	654,588	1,213,156	159,272	3,834	64,911	234	1,441,407
1918	508,880	634,950	1,143,830	160,844	1,330	108,296	110	1,411,410
1919	313,965	448,555	762,520	98,819	1,009	111,510	2,579	976,437
1920	449,330	537,070	986,400	104,980	1,729	155,196	3,237	1,251,542
1921	217,957	216,488	434,445	38,809	736	85,095	628	559,713
1922	425,981	404,767	830,748	47,733	1,045	154,982	1,034	1,034,508
1923	571,310	581,299	1,152,609	67,512	1,952	235,958	1,458	1,458,031

PRODUCTION OF FINISHED ROLLED IRON AND STEEL BY LEADING PRODUCTS, GROSS TONS, 1923.

Products.	Iron.	Steel.	Total.
Rails.....	.....	2,904,516	2,904,516
Plates and sheets.....	6,017	9,491,700	9,497,717
Nail and spike plate.....	103	22,730	22,833
Wire rods.....	780	3,075,112	3,075,892
Structural shapes.....	1,448	3,403,749	3,405,197
Merchant bars.....	404,730	5,148,066	5,552,796
Bars for reinforced concrete work.....	368	690,499	690,867
Skelp, flue, and pipe iron or steel.....	216,846	3,517,490	3,734,336
Hoops.....	.....	220,835	220,835
Bands and cotton-ties.....	2,813	345,667	348,480
Long angle splice bars, tie-plate bars, etc.....	40,495	709,329	749,824
Rolled sheet piling, not including fabricated.....	.....	36,716	36,716
Railroad ties.....	.....	20,167	20,167
Rolled forging blooms, forging billets, etc.....	3,181	445,689	448,870
Blooms, billets, sheet bars, etc., for export.....	.....	781	781
All other finished hot-rolled products, including hot-rolled strips and flats for cold rolling.....	278,816	2,298,433	2,577,249
Total.....Gross tons.	955,597	32,321,479	33,277,076

ALLOY STEEL INGOTS AND CASTINGS.

PRODUCTION OF ALLOY-STEEL INGOTS AND CASTINGS.

Years	Ingots.	Castings.	Total.	Years	Ingots.	Castings.	Total.
1910	538,462	29,357	567,819	1917	1,576,806	67,529	1,644,335
1911	425,169	56,290	481,459	1918	1,721,367	66,485	1,787,852
1912	689,392	103,109	792,501	1919	1,435,816	45,372	1,481,188
1913	625,430	88,927	714,357	1920	1,591,939	68,353	1,660,292
1914	577,107	69,846	646,953	1921	769,293	40,255	809,548
1915	923,251	97,506	1,020,757	1922	1,614,392	59,104	1,673,496
1916	1,306,157	56,458	1,362,615	1923	2,014,260	92,220	2,106,480

Similar statistics are not available prior to 1909.

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS BY PROCESSES, GROSS TONS, 1923.

Processes.	Ingots.	Castings.	Total.
Open-hearth steel—basic.....	1,612,312	3,786	1,616,098
Open-hearth steel—acid.....	109,676	38,656	148,332
Bessemer steel.....	109,851	20,621	130,472
Crucible steel.....	16,508	103	16,611
Electric steel.....	165,922	29,034	194,956
Total.....Gross tons.	2,014,260	92,220	2,106,480

In 1923 there were 147 works in 24 States and the District of Columbia which made alloy steel ingots or castings.

ROLLED IRON AND STEEL.

In 1923 the production of all kinds of iron and steel rolled into finished forms shows an increase of 6,825,072 tons, or 25.80 per cent., as compared with 1922.

TOTAL PRODUCTION OF ALL KINDS OF FINISHED ROLLED IRON AND STEEL, 1887-1923.

Years	Iron and steel rails.	Plates and sheets.	Nail plate.	Wire rods.	Struc- tural shapes.	All other finished rolled.	Total. Gross tons.
1887	2,139,640	603,355	308,432	.....	.....	2,184,279	5,235,706
1888	1,403,700	609,827	289,891	279,769	.....	2,034,162	4,617,349
1889	1,522,204	716,496	259,409	363,851	.....	2,374,968	5,236,928
1890	1,885,307	809,981	251,828	457,099	.....	2,618,660	6,022,875
1891	1,307,176	678,927	223,312	536,607	.....	2,644,941	5,390,963
1892	1,551,844	751,460	201,242	627,829	453,957	2,579,482	6,165,814
1893	1,136,458	674,345	136,113	537,272	387,307	2,104,190	4,975,685
1894	1,021,772	682,900	108,262	673,402	360,305	1,795,570	4,642,211
1895	1,306,135	991,459	95,085	791,130	517,920	2,487,845	6,189,574
1896	1,122,010	965,776	72,137	623,986	495,571	2,236,361	5,515,841
1897	1,647,892	1,207,286	94,054	970,736	563,790	2,497,970	7,001,728
1898	1,981,241	1,448,301	70,188	1,071,663	702,197	3,239,760	8,513,370
1899	2,272,700	1,903,505	85,015	1,036,398	850,376	4,146,425	10,294,419
1900	2,385,682	1,794,528	70,245	846,291	815,161	3,575,536	9,487,443
1901	2,874,639	2,254,425	68,850	1,365,934	1,013,150	4,772,329	12,349,327
1902	2,947,933	2,605,409	72,936	1,574,293	1,300,326	5,383,219	13,944,116
1903	2,992,477	2,599,665	64,102	1,503,455	1,095,813	4,932,185	13,207,697
1904	2,284,711	2,421,398	61,601	1,699,028	949,146	4,597,497	12,013,381
1905	3,375,929	3,532,230	64,542	1,808,688	1,660,519	6,398,107	16,840,015
1906	3,977,887	4,182,156	54,211	1,871,614	2,118,772	7,383,828	19,588,468
1907	3,633,654	4,248,832	52,027	2,017,583	1,940,352	7,972,374	19,864,822
1908	1,921,015	2,649,693	45,747	1,816,949	1,083,181	4,311,608	11,828,193
1909	3,029,845	4,234,346	63,746	2,335,685	2,375,562	7,711,506	19,644,690
1910	3,636,031	4,955,484	45,294	2,241,530	2,266,890	8,475,750	21,621,279
1911	1,822,790	4,488,049	48,522	2,450,453	1,912,367	7,316,990	19,039,171
1912	3,327,915	5,875,080	45,331	2,653,553	2,846,487	9,908,475	24,656,841
1913	3,502,780	5,751,037	37,503	2,464,807	3,004,972	10,030,144	24,791,243
1914	1,945,095	4,719,246	38,573	2,431,714	2,031,124	7,204,444	18,370,106
1915	2,204,203	6,077,694	31,929	3,095,907	2,437,003	10,546,188	24,392,924
1916	2,854,518	7,453,980	30,088	3,518,746	3,029,904	15,493,093	32,380,389
1917	2,944,161	8,267,616	22,864	3,137,135	3,110,000	15,585,921	33,067,700
1918	2,540,892	8,799,135	18,310	2,562,390	2,849,969	14,385,058	31,155,754
1919	2,203,843	7,372,814	12,832	2,538,476	2,614,036	10,359,543	25,101,544
1920	2,604,116	9,337,080	20,577	3,136,907	3,306,748	13,941,835	32,347,863
1921	2,178,818	4,260,574	14,573	1,564,330	1,272,624	5,483,067	14,774,006
1922	2,171,776	7,968,397	21,969	2,654,741	2,718,768	10,916,353	26,452,004
1923	2,904,516	9,497,717	22,833	3,075,892	3,405,197	14,370,921	33,277,076

THIRD QUARTER PRICES

Interest Centers on Sheets and Tin Plate at Youngstown—Low Plate Quotations

YOUNGSTOWN, June 3.—Interest in independent iron and steel circles centers in price developments for the third quarter, especially the prospective announcement by the American Sheet & Tin Plate Co. of third quarter prices on sheets. The average price now being secured by independent makers for base gage black sheets is from \$3.60 to \$3.65 per 100 lb., comparing with the nominal \$3.85 quotation of the leading interest.

Within recent weeks, however, the leading maker has been obliged to meet independent competition by effecting reductions and a lower third quarter "official" quotation is therefore expected, which would be more nearly in line with actual going prices. A quotation ranging from \$3.70 to \$3.75 is talked of in independent circles.

Much interest is also being displayed in the volume of contract tonnage which will come out in June for delivery over the third quarter. In anticipation of improved business following the National conventions, sheet makers hope that the larger buyers may be somewhat more liberal in awarding contract tonnages. On the other hand, it is pointed out early deliveries are possible even on small orders, and the inducement to place contract awards is not nearly so urgent as in periods of more normal business volume.

SHARP CURTAILMENT

Decreased Activity of Furnaces and Mills in the Youngstown District

YOUNGSTOWN, June 3.—Averaging 40 per cent, iron and steel production in the Mahoning Valley reaches a new low point this week for the year. Two more blast furnaces have been withdrawn from the active list, the Carnegie Steel Co. having banked another stack in the Ohio works group and the Youngstown Sheet & Tube Co. one of its East Youngstown furnaces. The latter interest is now operating but three of nine furnaces in the Youngstown district, one each in its Hubbard, Brier Hill and East Youngstown groups, while the Carnegie company has but two of six stacks at the Ohio works active.

Steel-making and rolling mill schedules also show declines this week as compared with previous weeks. The Republic Iron & Steel Co. has completely suspended its Bessemer department, on which extensive repairs will start. This suspension leaves inactive all of the independent Bessemer plants in the district. The Carnegie company is maintaining its two Bessemer departments at a greatly retarded rate.

Independent open-hearth production is unchanged, with 21 of 52 furnaces melting, while the Carnegie company is operating 12 of 30 open-hearths in this district.

Blast furnace reductions reduce the number of active furnaces to 14, of 45 in the Mahoning and Shenango Valleys.

The Sheet & Tube company has suspended its skelp mills, while the skelp units at the Girard works of the A. M. Byers Co., Pittsburgh, are likewise inactive. The Republic company is operating one skelp mill this week, the only active unit of this kind in the Valley.

Two tube mills have likewise been suspended by the Sheet & Tube company, reducing the number of active mills in the district from a total of 17 to 10. Of this number, the Republic company is operating four and the Sheet & Tube company six.

Tin plate departments are being maintained at a 75 per cent average.

Sheet Mill Schedules

Sheet mill schedules show a sharp decline this week, as compared with last, 53 mills starting the week. It was uncertain at the beginning of the week whether

No change is expected in the third quarter price of tin plate from the current \$5.50 quotation. A considerable volume of tonnage now on makers' books will be carried into the third quarter, inasmuch as the principal consuming interests have held down their specifications on account of the backward season. Within recent weeks, they have been somewhat more generous in their releases, but a large tonnage under contract is on makers' books awaiting release instructions.

Steel Prices Sagging

In other directions, steel prices are sagging. Distress prices on plates are appearing with considerable frequency, so that the 2.20c. "minimum" quotation is no longer regarded as the bottom of the market. Sharp reductions, scaling down to 1.90c. per lb. for tank plates, are reported as having developed, the chief interests to cut being Eastern makers. In this district plate mill operations are at a very low ebb.

Concessions from the bar market are not so violent as in steel plates, and makers appear to be holding quotations at 2.20c. in face of light buying.

Non-integrated sheet rollers expect to adjust third quarter contracts for sheet bars on a \$40 basis; this price at least represents the maximum market.

In finished steel lines, pipe continues to be the strongest single product in this district, with much to be desired in the way of new business. Large building projects continue to take most of the output of butt-weld mills, and the principal curtailment in output of steel tubes has been in the larger sizes.

all of the active mills would be continued in operation until Saturday or not. Resumption of its nine-mill sheet plant by the Sharon Steel Hoop Co. has been offset by the loss of nine mills by the Sheet & Tube company, five by the Trumbull Steel Co., four by the Newton Steel Co. and two by the Mahoning Valley Steel Co. The Newton company is operating this week at its lowest average of the year, with but six of 20 mills active.

Sharp curtailments have been made by the Carnegie Steel Co. in the operations of its district plants. It is operating about half of its bar mills at the Upper and Lower Union mills, and four mills at the McDonald plant, on a five-day week basis.

The Byers company continues to operate 88 puddling furnaces at Girard.

The Sheet & Tube company schedule for the week in the Youngstown district is: One blast furnace, five open-hearths, one blooming mill, 9-in. bar mill, eight sheet mills, rod mill, six tube mills, wire and conduit and puddling departments at East Youngstown plant; one blast furnace, four open-hearths, blooming mill on part time and 84-in. plate mill at Brier Hill; one blast furnace at Hubbard and four sheet mills at Warren, about 35 per cent.

Republic Iron & Steel is operating this week at 35 per cent in the Youngstown district, Trumbull Steel at 60 per cent and the Sharon Steel Hoop Co. at 90 per cent.

To Take Profit Out of War

WASHINGTON, June 2.—Representative J. J. McSwain, of South Carolina, has introduced a joint resolution proposing a commission to continue a study of plans to take the profit out of war. The House Committee on Military Affairs has held extensive hearings on bills introduced to this end. One of them, which has received a great amount of consideration, was prepared by Mr. McSwain. The Senate Committee on Military Affairs also has held hearings on the same subject.

Throughout the hearings there always existed the problem of legally commandeering capital and labor to be drafted into military service as strictly as soldiers are drafted. While the sentiment frequently was expressed that the President practically has unlimited power in time of war and with public opinion back of him, he could enforce sweeping action, such as the commandeering of capital and labor, it still was insisted that this probably would be unconstitutional.

BOOK REVIEWS

Frederick W. Taylor. Father of Scientific Management.

In two volumes. By Frank Barkley Copley. Pages xxviii + 467 and vii + 471, 6 x 9 in. Published by Harper & Bros., New York and London. Price, \$10.

Webster defines a biography as the written history of a person's life. Mr. Copley's work, therefore, is more than a biography, because, in addition to a wonderful description of Taylor's life, he gives a comprehensive description of the Taylor system or scientific management, as it is often called. In doing so, he was greatly aided by, and quotes extensively from, Taylor's writings, both published and unpublished. The unpublished writings quoted are chiefly letters which throw interesting sidelights on Taylor's life and work. He also acknowledges the aid of such persons as Mrs. Taylor, Sanford E. Thompson, Morris L. Cooke, Edward W. Clark, 3rd, Dr. Harlow S. Person, H. L. Gantt, H. K. Hathaway and Carl G. Barth.

After a foreword, in which the author concludes by apologizing (it would seem unnecessarily) for writing sympathetically and enthusiastically instead of in a detached fashion, and a prologue in which he epitomizes the life of Taylor, the work is divided into seven books, or the "seven ages" of Taylor's life. The first of these books deals with the ancestry and boyhood of Taylor. It starts with a genealogical sketch of the Taylor and Winslow families, showing the merging of Puritanism and Quakerism dating from 1677 and 1629 in this country. Brief sketches of Taylor's parents follow, and then a most entertaining description of Taylor's life as a boy and young man. It seems that his parents desired to make of him a lawyer, and for that purpose he attended Phillips Exeter Academy. From here he graduated with honors in 1874, but with eyesight seriously impaired for study. As a result of this calamity he returned to his home in Germantown and after some restless months, late in 1874, seized an opportunity to learn the trades of pattern-maker and machinist.

Thus Taylor entered the industry. After five years spent at these trades, he went with the Midvale Steel Co., where his system was developed, and books 2 and 3 are given over to his general work at Midvale and his development work there. Starting in as a laborer, he became a clerk, a gang boss, machine shop foreman, master mechanic, chief draftsman, and finally chief engineer—all within six years or up to the time he was 28 years of age. The position of chief engineer he held for the next six years and during this latter period was developed the system which was the cause of so much controversy before its eventual recognition. Exhaustively, albeit entertainingly, the author sets forth all the facts pertaining to Taylor's efforts and attainments in these twelve crowded years.

Upon severing his connection with Midvale, Taylor became general manager of the Manufacturing Investment Co., remaining three years with them, after which he saw the need for and started a new profession, becoming what is now termed a consulting engineer in management. Book 4 described his work along these lines up to his engagement by the Bethlehem Steel Co. in 1898.

Book 5 describes Taylor's three years at Bethlehem. After reading all that happened in that time one wonders how so much could be crowded into so short a time. For it was at Bethlehem that the famous application of involved mathematical formulas to slide-rules was made; that vocational guidance had its inception through Taylor's efforts to fit the man to the job best suited for him; that the high-speed steel which revolutionized the mechanical world was discovered and developed; and that shop methods and mechanisms to conform with all these epochal developments were inaugurated. And the pitiful part of it all is that Taylor, a high-strung, sensitive man, in his effort to benefit both the employer and employee stood between the two as between the upper and nether stones.

In the early summer of 1901 Taylor left Bethlehem, gave up all active business connections and made plans

to spend the rest of his life developing through writing and personal contacts with interested people the formulation and perfection of his system, and to this phase of his life book 6 is given over. Book 7, which concludes the work, deals with the last four years before his death in the spring of 1915.

Very subtly does Mr. Copley weave together Taylor, the man, with Taylor system and entertainingly describe some of the little known facts about Taylor. It will undoubtedly come as a surprise to many to read of Taylor's family life, and of how he kept business absolutely foreign to domesticity; of the fact that he and Clarence Clark won the tennis doubles championship of the United States in 1881; and that in championship play he once made a 76 on the Ekwanok golf course.

It is a book worth reading. And to those not familiar with Taylor's work and writings, it is suggested that this book with its voluminous quotations, properly indexed as to source, is a splendid means for gaining that familiarity. E. C. ROBERTSON.

Motor Fuels, Their Production and Technology. By Eugene H. Leslie. Pages 681, 6¼ x 9¼ in.; figures 166; tables 121. Published by Chemical Catalog Co., Inc., 19 East Twenty-fourth Street, New York. Price, \$7.

This really monumental work is useful as a reference in lines in which there is comparatively little on record; for instance, concerning the thermal reactions of hydrocarbons. Relatively little attention is given to the use of motor fuels, as distinguished from their production. The subject reminds us in passing of a remark by G. O. Smith, that the motto on our silver coins should hardly be made an essential policy in providing our future oil supply.

In one respect the author is an alarmist, as he considers the problem to be where motor fuel is to come from after ten years. The diagrams for the demand for and the production of gasoline in America for 1910-20 show startling curves. The world map showing potential reserves of petroleum points to the fact that we must smooth out our Mexican and Russian relations. The author is evidently no Scotist, or he would think more favorably of the possibilities of a shale oil industry. In speaking of alcohol he mentions only the ethyl spirit, and then principally in connection with gasoline or aromatic hydrocarbons; apparently forgetting, at any rate in this chapter, that two-thirds of Germany's industrial alcohol (made from potatoes) is nearly entirely used unmixed, when used as fuel.

He distinguishes between the cracking processes up to the last decade and of previous times when gasoline was regarded as a waste product, and cracking distillation proper, in which the object is to produce a maximum amount of gasoline and burning oils. The curves showing vapor pressures for various compositions, as also those of temperature and phase composition, are interesting. Ideal conditions of fractional distillation are laid down, for both batch and continuous distillation.

Chapter V, on Fluid Flow and Heat Transfer, should be studied by manufacturers of internal combustion engines; and by both manufacturers and users of steam engines (especially jacketed ones).

Various types of refining equipment are fully illustrated and well described in great detail. Knowledge of the thermal reactions of the hydrocarbons as outlined in Chapter VIII should be of special importance to the student of motor fuels from two standpoints: the manufacture of gasoline, and the burning of fuels in internal combustion motors; the summary, for instance, pointing out the difference between the decomposition of an oil in the liquid-vapor system and that when an oil is first vaporized and then thermally treated.

The claims of 75 to 90 per cent gasoline from a heavy oil are shown to be impossible, as both low- and high-boiling hydrocarbons are always produced by cracking, whether this is done by thermal and energetically treating the oil in vapor form, or applying the heat or other energy to the oil in liquid form, with some part of the latter in contact with vapor; and in either case with or without a catalyst.

Natural-gas gasoline has a chapter to itself. Alco-

hol, "a motor fuel of the future," is also assigned a special chapter. The production of alcohol from artichokes is mentioned only as a hint, no word being said about the quantity production in France.

The various composite and miscellaneous fuels, patent and other, are taken up *seriatim*; shale oil not being given due importance.

The work concludes with very useful data and tables. The references in the text to authors and publications are profuse, and the alphabetical indexes of each, a great help. The author deserves the thanks of chemists—and others. ROBERT GRIMSHAW.

The Electric Power Club has issued an 8-page "Code of Ethics" dated March, 1924, divided into general principles; relations of manufacturers to customers, agents or others; general relations of manufacturers to each other; and relations of manufacturers to each other in selling. Under each of these headings are found from three to nine separate topics covering the code established by the club in accordance with authority given at the June meeting in 1923. The list of member companies, which includes those subscribing to the code, covers about 75 names.

"Chambers of Commerce of the World" outside the United States are listed in a 60-page pamphlet just issued by the Chamber of Commerce of the State of New York. Copies of the pamphlet may be obtained without charge by addressing that chamber at 65 Liberty Street, New York. The preface to the pamphlet is printed in English, French, Spanish, Portuguese, Italian, German and Esperanto. The list, which covers many hundreds of organizations all over the world, is believed to be the first of its kind ever made available. Every nation, colony, protectorate and major political division throughout the world is listed in alphabetical order, with the population figures for the political divisions and for most of the cities.

Under the title "Facts and Figures of the Automobile Industry," the National Automobile Chamber of Commerce, 366 Madison Avenue, New York, has issued the 1924 edition of its statistical survey of the industry. Some of the outstanding figures were given in the advance report, published on page 1504 of THE IRON AGE, May 22. The book has 96 pages, full of statistics and charts, and is well indexed. It covers not only the automobile industry, but a number of other outstanding facts in the 1923 material history of the United States and shows the distribution of cars among the different States, and in all the countries of the world.

Under the title "How to Order Brass," the Chase Metal Works, Waterbury, Conn., has issued an attractive 40-page booklet, well illustrated and giving brass users a large amount of information on the qualities of brass required for various purposes. In particular, it explains what alloy, temper and gage mean in connection with the ordering of brass. It describes tests made and covers on six pages tables of brasses of various characteristics and indicates typical uses for those materials. The point is urged that brass is a metal of many uses and many characteristics and that the important thing for the user to decide is which characteristics are most useful for his particular case. The making of this decision is aided by information in the pamphlet.

Coming Meetings

Gas Products Association. June 10, 11 and 12. Tenth annual meeting, Ambassador Hotel, Atlantic City, N. J. C. T. Price, 140 South Dearborn Street, Chicago, secretary.

National Association of Office Managers. June 12, 13 and 14. Fifth annual conference, Niagara Falls, Ont. T. G. Woolford, Retail Credit Co., Atlanta, Ga., secretary.

American Society for Testing Materials. June 24 to 27. Twenty-seventh annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. C. L. Warwick, 1315 Spruce Street, Philadelphia, secretary.

NEW TRADE PUBLICATIONS

Air Compressors.—Sullivan Machinery Co., 122 South Michigan Avenue, Chicago. Bulletin No. 77-H. 32 pages, is devoted to angle compound power-driven air compressors, belted and direct connected classes. Bulletin No. 77-K. 16 pages, is devoted to belt-driven air compressors, single and two stage. In both of these there is a wealth of descriptive matter and illustrations.

Compressed Air Spader.—Sullivan Machinery Co., 122 South Michigan Avenue, Chicago. Second edition of Bulletin 70-X, 4 pages. Describes and illustrates the company's pneumatic clay digging tool, known as class DE-361, which is made up of a 17½ lb. air hammer, a steel spade and special retaining ring or bushing. The device is used in excavating in stiff clay in places where the ground is not sufficiently hard to be drilled and shot, and yet too hard to be handled readily by the pick and shovel method.

Dry Vacuum Pumps.—Sullivan Machinery Company, 122 South Michigan Avenue, Chicago. Bulletin No. 78-B, briefly describing the company's WA-61 steam-driven and WG-61 belt-driven single-cylinder vacuum pumps, which are built in capacities ranging from 100 to 1600 cu. ft. per min. displacement. Working dimensions and other data are given.

Pneumatic Tools.—Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago. Booklet 4 x 8½ in. 43 pages. A variety of equipment is briefly described and illustrated, capacities, weights, speeds, and other data being given. Drills, portable grinders, hoists, chipping, calking and flue beading hammers, foundry hammers, scaling hammers, riveting hammers, rivet and core busters, pneumatic holders on, and sand rammers are among the items shown.

Lathes.—Joseph T. Ryerson & Son, Inc., Sixteenth & Rockwell Streets, Chicago. Nielsen Survey No. 16 RYH of five pages, describing the performance of a Ryerson-Conradson 21 in. lathe used by the Detroit United Railway Co., Detroit. One of the lathes has been in 24-hr. service for almost a year, without a breakdown. It is used in turning down armatures weighing 1000 lb. and axle shafts weighing 450 lb. The operating cost of the machine is given as only \$0.0808 per hour, exclusive of labor costs. A saving of over \$820.00 a year is estimated, as compared to the previous equipment. The survey analyzes the operating cost in detail.

Wire Machinery.—Baird Machine Co., Bridgeport, Conn. Eight-page folder devoted to various types of wire machinery and featuring particularly wire straightening devices and a 6-spindle horizontal chucking machine. Wire reels of adjustable heights and adapted for either horizontal or vertical axes are shown, as well as details of attachments designed to increase production and promote safety.

Air Filters for General Ventilation.—Reed Air Filter Co., Louisville, Ky. Four-page folder giving standard specifications with diagrams for filters to remove dust, dirt, soot and bacteria from the ventilating air for a building. The specifications include standard sizes for various parts and incorporate details of construction and of installation.

Tight Line Construction of Leather Belting.—Graton & Knight Mfg. Co., Worcester, Mass. 8-page folder describing a method of belt construction in a two-ply belt in which the backbone center in one ply is separated from the backbone center of the other ply, thus giving what is believed to be a better balance, providing more elastic stock at the belt center and conforming more readily to the crown of pulleys. Uniformity of thickness and equalizing of strain are among the features claimed.

Valves.—The Edward Valve & Mfg. Co., East Chicago, Ind. Catalog No. 8, fully descriptive of the company's various types of valves.

Hot Process Water Softening.—Graver Corporation, East Chicago, Ind. 8-page pamphlet reporting on a survey of the use of a Graver hot process water softener by the Independent Pneumatic Tool Co., Aurora, Ill., in which it is shown that the saving in coal in the tool plant amounted to 1241 tons in a year, resulting in a net operating saving of \$6,810. The cost of the equipment was \$6,000; hence it appears that the cost was more than made up by one year's savings.

Ordinance Steel and Blast Furnace Problems (Continued from page 1640)

the prime price, he immediately comes to the conclusion that the price for the primes is too high and proceeds to try to beat it down.

I consider this question of trying to prevent the production of off-grade material as of great importance

and that it offers a possibility of large improvement. I believe that through special investigation, either carried on by individual companies or by branches of the industry, new uses should be developed for these off-grade products, and that our sales department should be educated into trying to handle this material on a scientific basis, with the idea of producing a profit out of it rather than the question of simply dumping the material in order to get it cleaned off the sheet.

Uniform Coking Coal and Blast Furnace Economy

BY WALTHER MATHESIUS

WALTHER MATHESIUS was employed in various operating capacities in blast furnace, open-hearth, foundry and rolling mill plants in Germany, 1904-06. He was graduated from the Institute of Technology, Berlin, Charlottenburg, 1910; was in the research department of the American Steel & Wire Co., Worcester, Mass., 1911; assistant superintendent of blast furnaces, South Works, Illinois Steel Co., South Chicago, 1912-17, and superintendent of blast furnaces, South Works, Illinois Steel Co., 1917 to date. He has previously presented several papers before the American Iron and Steel Institute.



THE most important function of the (blast furnace) process is the reduction of the metallic oxides contained in the iron ore. To accomplish this object efficiently requires the constant maintenance of a delicate chemical and thermal equilibrium between the reducing gases and the components of the furnace burden. The degree to which this demand is met and coordinated with maximum utilization of plant equipment determines blast furnace success.

Compared to these factors the so-called hearth reactions, that is the melting of the resultant iron and slag, have in a normally working furnace a secondary role and it follows that the effect of variations in their efficiency upon the economy of the process is also of lesser importance.

An entirely different aspect presents itself, however, through realization of the fact that upon the hearth reactions is devolved the two-fold duty of controlling the quality of the product and at the same time of absorbing and, as far as possible, compensating for irregularities of the entire furnace process.

Present Cases of Uniformity

Uniformity, as the keynote to blast furnace success, has been sounded so frequently in recent years as to almost appear commonplace to many men not directly connected with furnace operation. Those, who have been fighting in the apparently incessant struggle for its attainment, hope to see the day when it will really deserve that name through universal acceptance of its principle as an absolute essential, not only in their own limited field, but in all of the contributory industries as well.

Yet, preaching the gospel of uniformity has not been in vain. It is a pleasure to compliment here the understanding on the part of the iron ore trade for the needs of the blast furnace industry. For the limestone trade it may be said in this respect that gratifying improvements have been made during recent years, but that in many instances it is still several laps behind its big brother, the ore business. In keeping with these tendencies, commendable progress has been made toward

perfecting blast furnace blowing equipment, so as to obtain a definite volumetric efficiency and accurate speed control.

In marked contrast to this constructive development stand today the conditions which still exist in and largely govern the manufacture of blast furnace coke.

A wide range of irregularity is in fact the outstanding feature of the blast furnace fuel supply at a majority of plants. The discrepancy in this respect, which so generally exists between the coke and all other raw materials is so prominent, and so vital is the betterment in the economy of blast furnace work which it seems reasonable to expect from the possible improvement in fuel regularity, that the necessity of a closer cooperation of producers and consumers of blast furnace fuel is undeniable and its accomplishments at an early date inevitable.

Increasing Productive Capacity

The urgency of a prompt adjustment is of course greater in districts where, on account of high fuel prices, long railroad hauls of coal or coke, high coking costs, etc., the fuel expense per ton of pig iron is comparatively large and where, therefore, the savings to be effected by a reduction in the fuel rate are relatively great. But even in territories enjoying the advantage of lower priced fuel, the possibility of increasing the productive capacity of existing furnace plants, which as an acknowledged fact is within wide limits inversely proportional to the coke rate, should warrant careful consideration of the following:

1—Coke ash is as a rule of a silicious nature and through combination with the fluxing materials becomes during the melting process a part of the blast furnace slag, in exactly the same way as other non-metallic constituents of the burden. Variations in coke ash, therefore, cause a disturbance of the hearth equilibria and accordingly affect the blast furnace process just as has been described at the beginning of this paper with reference to raw materials generally.

2—Coke is in the blast furnace burden the principal source of sulphur, the satisfactory elimination of which in the furnace hearth requires a definite combination of temperature, slag composition and slag

volume. With temperature dictated by pig iron specifications, it is obvious that sulphur entering the process in excess of the amount which the available slag volume of a given basicity can absorb, is transferred to the metal, reducing its sales value or its usefulness for steel making purposes. Coke of irregular sulphur content demands, therefore, a costly increase of the safety margin in blast furnace practice.

3—Every variation of the ash content in the coke is necessarily accompanied by a corresponding change of its carbon percentage and fuel value. This magnifies the effect on the blast furnace work of a given irregularity in coke as compared to that resulting from an equivalent change in the ore burden, since in the latter case all variations are confined to the negative side of the heat balance, which means further that at times a tendency to automatic compensation is possible.

4—Irrregular ash content of furnace coke denotes variations in the composition of the coal from which the coke was produced. Charging irregular coal in the ovens always varies the heat requirements of the coking process and therefore disturbs its thermal balance, the accurate maintenance of which is a most important prerequisite to the making of physically uniform coke. In spite of a regular heat input and otherwise best practice, the production of coke with variable physical characteristics becomes unavoidable. This physical irregularity has a serious effect on blast furnace economics, because its influence is not confined to a disturbance of the equilibria in the furnace hearth, but extends directly throughout the entire furnace process. Non-uniform coke size creates irregular distribution and varying permeability of the stock column; uneven stock descent and uncontrollable flue dust losses result. Complete and timely reduction of the ore charges becomes impossible, and a heavy demand arises for solid reduction carbon and for a large amount of additional heat to cover the greatly endothermic effect of this reaction. Hand in hand with severe changes in the rate of combustibility goes a varying vulnerability of the coke to solution by the CO_2 content of the furnace gases, depriving the process of another irregular share of the fuel as originally charged to supply its legitimate needs.

Here we are confronted with blast furnace work at its worst, and often so in the face of a most attractive set of average coke analyses. Intelligent operation, the best of plant equipment and furnace lines, become checkmated and can do no more than to ward off serious difficulties. At the same time we find our curative efforts taxed beyond their capacity by an endless chain of troubles with guesswork, sometimes erroneously called intuition, as our only and frequently deceitful guide.

If it may be considered established that major irregularities are encountered in the blast furnace fuel supply, and if it is realized that they are the rule rather than the exception today, the serious detriment which is inflicted thereby on the economy of pig iron production should be clearly apparent.

One Remedy

There is only one possible remedy, and that is the regulation of the blast furnace fuel supply in accordance with the principles of the iron ore trade, so that as nearly as this can be accomplished with our present knowledge and ability, every coke charge entering the

individual blast furnace may within a given weight and volume convey into the process the same fuel value with the same chemical and physical characteristics.

Visualizing the economic significance of the possible improvements, it is rather difficult to comprehend why their accomplishment is achieved today in only a small minority of operations. The most plausible explanation appears to be the absence of a clear understanding of the blast furnace needs on the part of coke producers and the coal mining interests.

[Here follows a discussion of the mining and storage of coal and the beehive and by-product processes.]

In the author's opinion, the required remedy consists in applying to the mining company's cost sheets the same principle which is embodied in the docking schedules for the individual miner. In other words, it is suggested that coking coal shipments be accounted for on the basis of a fixed ash percentage, agreed upon for each grade of coal handled, and that penalties be attached for higher ash as well as irregularities beyond a definite range, and premiums granted for lower ash content by subtracting or adding tonnage as credited to the mine. It is believed that this accounting tonnage could represent an equitable measure for value received by the consumer and at the same time for the efforts of the mining organization toward producing from its coal acreage a maximum output of the highest grade fuel aiming at best ultimate economy rather than merely lowest cost per ton of material brought to the surface. Coordinating in this manner the interests of the mine management with those of the individual miner should produce the desired end.

The proposed accounting method is not so novel as it might seem. A comparison will readily show that it is based on the same principle as the universally established practice of trading in iron ores.

Ash Content of Coal

Another factor of importance which is sometimes lost sight of is the extent to which the ash content of the coal as actually shipped is above the ash percentage which would be obtained from the same coal seam by careful mining. It is evidently the latter figure which should be used as a basis in the discussion of plans for mechanical coal cleaning together with corresponding data on the degree of irregularity which might still be evident in the coal mined under these conditions. While all efforts toward greater uniformity in coal should be heartily encouraged, the installation of mechanical cleaning plants should not be considered as a "sine qua non."

To obtain better coking coal from the mine the intelligent and willing cooperation of the coal consumer is absolutely necessary. It may be confidently expected that a vastly more satisfactory arrangement would result from the adoption of the proposed plan to adjust coal prices, or tonnages credited, on an analysis basis and in proportion to the fitness of the deliveries for their intended use; intelligent arrangement of sliding scales should profitably promote the chances for better coal and greater constancy of grade.

For an adequate return from the efforts which it is herewith suggested be put forth by the purveyors of blast furnace fuel, the blast furnace industry must evidently hold itself largely accountable.

Manufacture of Steel for Ordnance Purposes

BY COMMANDER J. B. RHODES*

IN the manufacture of guns and ordnance parts subject to great and sudden stresses, there has been developed a steel which requires certain qualities and methods of manufacture, not necessary in ordinary commercial steels. In a "man-of-war" it is imperative to get the greatest strength in the limited weights that can be assigned to the various parts. Year after

year the weights have been reduced as stronger materials have been made available. There is at present a call for steel of similar characteristics for small forgings in automobiles. For want of a better name we shall call this material "ordnance steel."

The greatest steps in improving ordnance steels to date have been in the heat treatment, after the metal has been melted and forged. In fact, since the introduction of physical testing and metallographic examination, it has been possible so to standardize the thermal treatment that there is no longer much mystery in heat treatment.

*Commander Rhodes has been in the Navy since 1903. During that time he has had three years in the Naval Gun Factory in 1913, 1914 and 1915, and two years in command of the armor and projectile plant at Charleston, W. Va. 1918 and 1919. His present duty at the Naval Gun Factory began in 1923.

[The author discusses at this point some fundamental reactions and conditions in steel-making processes.]

Electric Furnace Slags

This paper is largely devoted to the subject of making slags and it will be supplemented by some chemical results that have been obtained. The chemical composition of slags has been described in text books, but the slags described below were taken from large electric furnaces and in all cases the physical values on tangential test were superior to 100,000-70,000-20-45. When it is considered that these were transverse tests of nickel steel, it seems fair to say that the elimination of sulphur and phosphorus as shown by the analyses (under 0.025 per cent) and the elimination of iron oxide as indicated by the small amount in the slag and the low manganese in the slag, has produced the best ordnance steel. The slag should not contain more than 1 per cent of FeO nor more than 0.50 per cent MnO and not more than 1.25 per cent FeO plus MnO.

If the slag is properly made, the steel will almost take care of itself. The making of proper slags depends a great deal upon the tool used. The electric furnace is the best tool, for we can hold the steel in the furnace and alter the slag by increasing the heat.

In an acid open-hearth furnace, as stated before, the silica (SiO₂) of the acid slag will take up iron (Fe) from the bath and reduce silicon into the steel; this maintains the percentage of iron oxide plus manganese oxide of the slag at about 35 per cent, measured in terms of metallic iron and manganese. So we never get acid slag entirely free from iron oxide, but when we are reducing silicon into the metal, as shown by the increased silicon of the metal, we can be confident that there is not a harmful amount of iron oxide remaining in the bath. The addition of lime and fluorspar to thick and viscous acid slags frees iron oxide from the slag to reduce the carbon of the bath and reduces the amount of iron oxide in the slag. Proper acid open-

inate other factors which can cause defects in the transverse tests which are taken for ordnance steels. The rate at which the mold is filled must be made as slow as possible; the temperature of pouring must be kept down. These two factors, when properly controlled, give a characteristic appearance of the top of the metal in the mold, which has been described as of a breaking creamy appearance.

The thickness of the mold must be great enough to give the least possible time for the reactions to take place. Thick mold walls with a ratio of 3 to 1 will chill the metal and give the maximum practicable speed for solidification.

Some Reactions to Consider

In spite of our efforts to remove oxygen from steel and to obtain inactive slags, there are further reactions to be reckoned with. Even if the steel in the furnace has reached the limit as regards cessation of reactions, yet the agitation of the metal from the furnace to the ladle and from the ladle to the mold, the change in the temperature that occurs after the heating has ceased and the exposure of the metal to the oxygen of the air, will so change conditions as to permit the occurrence of reactions, in the solution of iron, oxygen, carbon, silicon, manganese, sulphur, phosphorus and alloys. Such reactions, affecting the intergranular structure of the metal, continue to occur until the metal has solidified and the grains have formed. These reactions produce gas or solid nonmetallic impurities, which cannot escape during solidification, evidence of which is found under the microscope in the form of gas holes or inclusions.

The formation of gas or inclusions is less pronounced in metal which remains in the mold for the shortest possible time in the liquid state. This quick chill is obtained by (1) slow pouring, using small nozzles, (2) holding metal in furnace and in ladle, (3) use of ingot mold with an area of mold about three times as large as the area of the metal which it contains.

The use of heavy chill molds to prevent the formation of gas holes has led to the abandonment of the advantages of bottom pouring. It is recognized that bottom poured ingots have excellent surface and that they forge well, but this is partly offset by the risk of carrying into the mold the inclusions resulting from the reaction between the runner brick and the metal and even the scourgings from the brick. In using the heavy chill molds and obtaining the quick chill, it has been found that the use of a pouring box or tun dish gives more uniform rate of pouring and a better average appearance of the bottom of the ingot.

Variables Affecting Quality

The quality of a heat of ordnance steel is the result of a large number of variables. It is believed that the variables are important in about the following order: (1) slag composition, (2) pouring temperatures, (3) rate of pouring, (4) size and condition of nozzles, (5) time held in furnace and ladle, (6) kind of charge into the furnace, (7) temperature of ingot when stripped, (8) temperature of ingot when heated for forging. These variables are recorded for each heat and made available for analysis and comparison with the history of the piece until it has been subjected to physical test.

Study of records showing these variables has resulted in "Shop Practice Instructions." These shop practice instructions are believed to be necessary in order to reduce the number of variables. All the points given in the shop practice instructions have been proved in practice and it is believed that steels made under conditions where these points are not attended to will only by rare good luck and excellent practice in all other variables be able to meet the physical tests as specified for ordnance steels.

Shop Practice Instructions

The following practices will be observed in the handling of the melts:

Melting: In acid steel, reduction of carbon in the bath shall be accomplished at least two hours before tapping, in order to allow ample time to condition the

Analyses of Slags in Electric Furnaces Making Ordnance Steels

SiO ₂	FeO	Al ₂ O ₃	MnO	CaO	MgO	P	S
Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent
19.54	0.58	4.27	0.06	62.86	7.38	0.004	0.687
18.38	0.83	3.15	0.21	62.22	8.34	0.005	0.444
24.01	0.90	3.16	0.34	50.74	15.55	0.001	0.308
19.20	0.75	4.39	0.52	61.78	12.77	0.044	0.360
19.54	0.54	4.27	0.06	62.88	7.38	0.004	0.360
18.38	0.83	3.15	0.21	62.22	8.34	0.005	0.444
.....	0.64	.....	0.05	63.38	.....	.....	.....
.....	0.85	.....	0.15	55.88	.....	.....	.....
.....	0.61	.....	0.10	59.40	.....	.....	.....
.....	0.81	.....	0.10	56.76	.....	.....	.....
.....	0.57	.....	0.12	54.88	.....	.....	.....
.....	0.77	.....	0.12	56.56	.....	.....	.....
.....	0.53	.....	0.04	62.26	.....	.....	.....
.....	0.43	.....	0.26	59.92	.....	.....	.....
.....	0.65	.....	0.06	60.16	.....	.....	.....
.....	0.65	.....	0.05	52.36	.....	.....	.....

hearth slag will be green in color, due to manganese oxide, vitreous and free from blowholes in samples taken of the slag.

Removal of Iron Oxide

Some steel makers state that the elimination of oxide from steel is not necessary. This is probably based on the fact that they have produced steel, which has been used in guns, which they know has contained oxide. The fact that steel containing iron oxide and blowholes, but no inclusions, is superior for tin plate, for example, does not mean that similar steels can be used for ordnance, for the accumulation of the inclusions into globules of relatively large size is safer than the distribution of such oxide between the grains. With steel so thoroughly killed as to give off no gas, we get material so dense that there is a risk of cracking on solidification. This must be taken care of by teeming at a slow rate and by allowing the metal to cool to a point where there will be a small skull in the ladle and barely be heat enough to run through the nozzle without streamers.

Besides the objectionable iron oxide we must elim-

slag and obtain the necessary temperature conditions for effecting refinement. The refining operation can be facilitated by adding silicon to the slag and ferro-alloys to the steel, but such practice is not so desirable as accomplishing the desired refinement through temperature control and slag control.

Slag: In basic electric steel, the sum of iron and manganese oxides expressed in terms of metallic iron and manganese shall not exceed 1.25 per cent. In acid open-hearth steel, the sum of iron and manganese oxides expressed in terms of metallic iron and manganese shall not exceed 35 per cent. In the basic electric slag, this condition will be met, when a slag is produced which gives off strong acetylene fumes and disintegrates into a pure white powder. In acid slag, it is met when the slag is light green in color, and solid and free from blowholes.

Composition: The steel shall be finished in the furnace to the composition specified on the melt orders and no additions for correcting the composition of the steel shall be made in the ladle. The use of aluminum in the ladle is not forbidden.

Teeming: The teeming of ingots shall be such as to cause the most rapid transformation from the molten to the solid state. Metal shall be held in the furnace and in the ladle for a sufficient time to obtain the lowest temperature consistent with successful teeming. The rate of pour shall be kept as slow as is consistent with clean surfaces. Unless specifically

authorized, all heats shall be box poured, using the smallest nozzle in the box which practice has shown to be usable.

Stripping of Ingots: Stripping shall be accomplished at temperatures not below 1600 deg. Fahr., ingots to be immediately transferred to the forge shop whenever practicable. When delays in transportation to the forge shop are unavoidable, ingots shall be buried in sand or ashes so as to retain all the heat possible.

Discussion

John A. Mathews, president Crucible Steel Co. of America, pointed out that metallurgical science is as truly a chemical matter as the making of dye stuffs. He called attention to cases where drop forgings made from identical specifications of steel varied so much in qualities that it was necessary to vary the drawing temperature as much as 200 deg. The qualities of the steel did not appear to follow either the chemical composition or the physical qualities as determined by tests. Pointing out the total inadequacy of our present definite knowledge of metallurgical science, the speaker stated that there is no more promising field in metallurgy than the study of furnace reactions as a basis for determining the reasons for variations in different steels of the same composition.

Composition of Raw Materials and Pig Iron Costs

BY THOMAS T. READ

THOMAS THORNTON READ was born at Coltsneck, N. J., in 1880, and graduated from Columbia University 1902 as engineer of mines, receiving his doctor's degree in 1906. He was an instructor of mining and metallurgy at the University of Wyoming, Laramie, Wyo., 1902-4; assistant in mineralogy, Columbia University, 1905-6; chief assayer, Orford Copper Co., Camden, N. J., 1906; professor of mining and metallurgy, Colorado College, 1907; professor of metallurgy, Pei Yang University, Tientsin, China, 1908-10; associate editor of *Mining and Scientific Press*, San Francisco, 1911-1915; chief of service division, technical department, New Jersey Zinc Co., 1916-18; chief of reviewing branch, requirement section, Ordnance Department, U. S. Army, 1918; chief of Information Service, U. S. Bureau of Mines, 1919; representative of Interior Department on United States Commission to Brazilian Centennial Exposition, 1922; supervising mining engineer, Bureau of Mines, 1923; acting assistant to Director of Bureau of Mines, 1924.



THE effect which the composition of the raw materials used has on the cost of the pig iron produced was forcibly called to my attention some months ago, when I was instructed to make a study of the broader problems involved in the beneficiation of low-grade iron ores. The fundamental question in beneficiation is how much more is the ore worth after beneficiation than it was before. To answer this question involves a critical study of the factors that enter into a determination of the relative worth of different grades of iron ore, coke, and stone; and a correct determination is by no means easy. The cost of these things, as delivered at the blast furnace plant, is not an index of their real worth. The price of the pig iron produced is determined by market conditions and the relative worth of different grades of raw materials can be accurately determined only by reckoning their relative effect upon the cost of producing pig iron from them.

Rule Governing Relative Worth

Since raw materials are always used in combinations, it naturally follows that raw materials may have different relative worth to different people, if the combinations of which they form a part are different. A given raw material may in one combination serve to

decrease the cost of the smelting operation and in another to increase it; its relative worth in the second case is less than in the first. The precise determination of relative worth, therefore, has to be made for a specified combination, but in order to arrive at a precise determination it is necessary to consider the general rules which govern relative worth, as indicated by a study of average conditions.

The average conditions in smelting raw materials to make pig iron in this country, as set forth in the annual statistical report of this association, involve the smelting together of 3950 lb. of iron ore, 345 lb. of ferrous material other than ore, 2176 lb. of coke, and 970 lb. of stone, to produce a ton of pig iron. I am dealing with averages and therefore no distinction is made as to the grade of pig iron desired, since that is a factor which must be considered in individual cases. The average pig iron probably approximates to basic pig, since over 50 per cent of the metal produced is of that grade. There is no way of getting at the average composition of all the iron ore smelted in this country, but the ore produced in the Lake Superior region amounts to 85 per cent of the total, and for that we have, thanks to the Lake Superior Iron Ore Association, quite complete statistics. The association's average figures indicate

that the Lake Superior ore shipped in 1922 had the following average composition:

Fe (natural)	SiO ₂	H ₂ O	P	Mn
51.87	8.23	10.78	0.099	0.76

There is no practicable way of getting at the average composition of coke or of stone, but we shall not be far wrong if we assume that coke on the average contains 86 per cent fixed carbon, 6 per cent silica, 2 per cent alumina, 2 per cent lime and 1 per cent sulphur. Coke as actually charged to the blast furnace contains a variable percentage of moisture, but where blast furnace records are kept on the basis of skip-loads this variable tends to cancel out, since the moisture does not affect the volume. For simplicity's sake the impurities in the stone will be neglected, for there is no known way of getting at average figures and the impurities are not important on the average, though they may be in individual cases.

Silica Most Important

Neglecting for the moment the iron in the ore and the carbon in the coke, the most important item in the list of components is the silica, from the standpoint of both quantity and the effect it exerts on the blast furnace process. It is the silica in the ore and the coke that makes the addition of stone to the charge necessary, so that the whole cost of stone in smelting might be ascribed to the silica in the raw materials. But we cannot deduce from this that, if we could eliminate silica from the raw materials, we could also eliminate the limestone and thereby greatly decrease the cost of pig iron, for the matter is not so simple. Sulphur, which is present in the raw materials in quite small amounts, has a tremendous effect on the blast furnace process. Sulphur has so bad an effect on iron and steel that specifications never admit of more than one-tenth of 1 per cent in the finished product and in rivet steel, for example, only one-twentieth of 1 per cent is admissible. Sulphur is so resistant to methods of removing it that the only good way is to keep it from ever getting into the pig iron; and this is one of the most important factors in blast furnace operation. What relation this has to silica in the raw materials is set forth as follows.

In a careful study of the operations of 38 blast furnaces, made by T. L. Joseph of the Bureau of Mines, and to be published later, it was found that over 90 per cent of the sulphur entering the blast furnace with the raw materials was brought in by the coke, and only 7 per cent by the ore. Less than 5 per cent of the sulphur charged is permitted to go into the pig iron, over 85 per cent goes off in the slag and the rest is unaccounted for. The blast furnace must get rid of over 95 per cent of the sulphur charged to it without letting it get into the iron. This makes it necessary to adjust both the quantity and composition of the slag. It must be higher in lime, so it will take up and retain the sulphur and it must be large enough in amount to take care of the total quantity. On the average, charcoal blast furnaces make only half as much slag per ton of pig iron as coke furnaces, because they have to dispose of less sulphur.

Extra Slag and Costs

This extra slag adds to the cost of the pig iron in a variety of ways. The slag-forming materials displace iron from the charge and cut down output, and what is much more important, they make it necessary to use additional coke to fuse them and this extra coke brings in more sulphur. In a recent paper (Reports of Investigation No. 2560, Bureau of Mines) Mr. Joseph and myself have computed that an extra pound of slag requires a little over half a pound additional coke. As the slag of the 38 furnaces referred to above averaged 1.67 per cent sulphur and the coke about 1 per cent sulphur, the final outcome of increasing the slag and adding coke is the elimination of the sulphur, but at a heavy cost.

One pound of additional silica in the charge over the amount that gives the best results adds 1½c. to the cost of a ton of pig iron through increasing the slag volume, according to the data in the paper cited above. One pound of sulphur added to the charge would add 0.85 of a pound of sulphur to the slag, which would require 50 lb. additional slag to carry it off without in-

creasing the percentage content; and this slag would require 20 lb. more coke, which would bring in a quarter pound more sulphur, and so on. On this basis one pound of extra sulphur per ton of pig iron in the charge adds about 35c. to the cost of the ton of pig iron.

One of the most important problems of the iron industry today is the securing of low-sulphur coke for blast furnace operation. This problem has been extensively studied by the Bureau of Mines and a number of papers on this subject by A. R. Powell and his associates of the bureau staff have been published.

The foregoing analysis gives us a general rule as to the amount of silica there should be in a blast furnace charge. There should be enough to yield a sufficient quantity of slag of the right composition to take care of the sulphur in the charge. Every pound of silica above this amount in a sufficient weight of charge to yield a ton of pig iron adds 1½c. to the cost of the ton of pig iron, or, putting it in another way, every pound of silica in an ore above the amount that gives the right slag volume takes ¾c. per ton off the value of that ore to the blast furnace operator. The value of such an ore therefore depends on the charge combination in which it is used. To an operator who needs to get more slag volume a high silica ore is desirable, within limits; while to the man who has enough slag volume it makes an unwelcome addition to the smelting cost, unless it can be bought enough cheaper to counter-balance.

Adding to the Charge

The ash constituents of coke seem small in percentage, but the tremendous effect of the sulphur has already been discussed. Six per cent of silica in the coke does not sound important, but it corresponds to 120 lb. of silica, or about 360 lb. of slag per ton of pig iron, and not only involves the adding of about 360 lb. of limestone to the charge, but requires 180 lb. of coke for the extra slag. Nearly 10 per cent of the coke required per ton of pig is needed only for fusing the ash in the coke itself. The coke needed to fuse the ash brings in more ash, and here again we have the situation that, as in the case of the sulphur, the remedy adds to the disease. In the case of coke that contains over 14 per cent ash, not only is this difficulty accentuated, but S. P. Kinney has found, in an unpublished study of a single plant, that coke which carries over 20 per cent ash apparently produces a number of difficulties, due to altered conditions created in the bosh. At any rate every additional pound of silica in the coke not only means a pound less of carbon in the coke, but makes 3 lb. of slag, which calls for 1½ lb. more coke. On this basis, if 2000 lb. of 86 per cent fixed carbon coke has cost \$5.70 by the time it is in the blast furnace, then we are paying 3c. per lb. for the carbon, and one pound additional silica in the coke will take 7c. off its worth to the furnace. A pound of silica more or less may seem a small matter, and yet a metallurgist will ordinarily devote a good deal of thought to the possibility of cutting his production cost 7c. per ton.

Pullman Co. Will Segregate Its Manufacturing Operations

The Pullman Co., Chicago, plans to segregate its manufacturing from its sleeping car business in order to obtain relief from Interstate Commerce Commission regulation of the manufacturing department and to widen the field from which business can be drawn. The Pullman Car & Mfg. Co. is the name suggested for the company which will take over the manufacturing plants, which include carbuilding shops directly owned and those of the Haskell & Barker Car Co., Michigan City, Ind., the stock of which the Pullman Co. now holds. It is understood that the directors of the new manufacturing subsidiary will be so chosen that they will not interlock with the directorates of important railway systems and its business with the railroads will thereby be increased, inasmuch as the interlocking directors of the Pullman Co. have proved a handicap in soliciting orders from railroads of which they are also directors. The application for approval of the segregation will be filed soon with the Interstate Commerce Commission.

Plans of New Companies

The Uline Ice Scoring Machine Co., organized with capital stock of \$125,000 in preferred and 5000 shares of no par value common stock, will manufacture ice scoring machines. L. L. Frost, 958 Wall Street, Toledo, Ohio, is one of the principals.

The Scaling Equipment Corporation, 1201 Hudson Street, Hoboken, N. J., incorporated with capital stock of \$20,000, will manufacture mechanical devices for scaling tanks, boilers, ships' hulls, etc. H. L. Moeller is secretary.

The La Fon Mfg. Co., 33 East Kinney Street, Newark, N. J., has been organized to manufacture metal parts used in concrete construction. It is in operation on a small scale and expects to buy a plant in about a year. The company also does stamping work. Alphonse La Fon heads the company.

The Deerhead Corporation, care of E. Copeland, 152 West Forty-second Street, New York, has been organized with \$50,000 capital stock to deal in scrap metal products. It will be several weeks before the company is active.

The Wilson Marine Works, Inc., 1 Atlantic Avenue, Brooklyn, has been incorporated with \$50,000 capital stock to operate a general marine engine works for repair and production of parts. Operations are now under way. J. Druit, M. L. Nathanson and J. L. Schneider are the incorporators.

The International Steel Co., organized some time ago in Portland, Ore., by G. F. Hickok of Hickok & Hickok, San Francisco, has opened offices and a warehouse at 910 First Avenue, Seattle, Wash., where a full line of alloy and drill steel will be carried. The company also acts as representative for the Edgewater Steel Co., Pittsburgh, the Pollak Steel Co., Cincinnati, the United Alloy Steel Corporation, Canton, Ohio, and other concerns.

The Otis Engine Corporation, 247 Park Avenue, New York, has been incorporated with 1000 shares of stock, no par value, to manufacture gasoline engines and automotive accessories. Its plans are not fully completed, but announcement will be made in the near future. The incorporators are Otis Presbrey, J. D. Numan, Jr., and G. Zeim.

The Emerick Liquid Container Co., New York, has been incorporated with \$100,000 capital stock to manufacture metal containers. It is concerned at present with organization matters and plans for manufacturing have not developed. Incorporators are C. Emerick and S. J. Kanin. Temporary address is in care of Samuel Meyers, Times Building, New York.

The Associated Bodies Corporation, Louisville, Ky., has been organized by F. W. Hohensee, vice-president, Durant Motors Corporation and W. W. Murphy, treasurer, Durant Motors Corporation, together with other Louisville interests. Authorized capital consists of \$1,000,000 divided into 10,000 shares. Besides the major product which will be automobile bodies, the company will manufacture motors, shock absorbers, batteries, etc.

Interests said to be identified with the Pennsylvania Water & Power Co. have formed a new company, capitalized at \$3,500,000 for the purpose of building a power plant at Holtwood, Pa., which is expected to go into operation early next spring. It will have an ultimate capacity of 100,000 kw. and an initial installation of 20,000 kw. Contract has been placed for two units and work will begin at once. J. E. Aldred & Co., New York, will finance the company.

The Cook Corporation, Buffalo, has been organized with \$50,000 capital stock to manufacture automobile rim tool removers. Parts are manufactured by contract, and the company maintains an assembling plant, which is fully equipped. Harold E. Cook is president.

The Newark Steel Drum Co., 241 Riverside Avenue, Newark, N. J., has been organized as dealer in new and used drums. C. J. Colville heads the company.

The Houck Machine & Tool Corporation, 16-18 Norris Avenue, Buffalo, has been organized with capital stock of \$25,000 to manufacture gages, fine tools and special machinery, particular attention being given to jigs and small interchangeable tools. It has a shop with complete equipment and is in a position to manufacture machinery in quantities. Conrad C. Weidemiller is president and treasurer, and W. V. Houck, vice-president and general manager.

A. B. Landis' Sons, Inc., will file articles of incorporation June 9, as a development of the partnership of A. B. Landis & Sons, Cresheim Avenue and Queens Street, Chestnut Hill, Philadelphia, grinding specialists. The existing organization was formed by A. B. Landis, founder of the

Landis Tool Co. and the Landis Machine Co., Waynesboro, Pa. The new company will continue commercial and precision grinding and the manufacture of hardened and ground parts. The manufacture of a regular product also is being considered. B. F. Landis is president, H. L. Landis, vice-president, and A. F. Landis, secretary-treasurer.

The Johnson Airplane & Supply Co., with hangars at Wilmington and Patterson Roads, Dayton, Ohio, has been organized with \$125,000 capital stock and will maintain a large stock of airplane parts and materials. It will also overhaul airplanes and motors and operate a commercial flying field. J. M. Johnson and E. A. Johnson are the principals.

The American Radio Tube Works, 1108 Clinton Avenue, Irvington, N. J., recently organized to manufacture radio products, will be in the market within few weeks for equipment which will be installed in a new plant. E. J. Zeitlin is one of the principals.

The Bell Furnace & Mfg. Co., Northville, Mich., has been organized with capital stock of \$40,000 to manufacture furnaces, parts and other iron products. The company is now active. James A. Huff is general manager.

The Cochran Electric Co., 423 Franklin Avenue, Woodlawn, Pa., has been organized to act as distributor of automobiles, accessories and parts, and also to operate a general repair plant. H. J. Cochran is president.

Davis, Kraus & Miller, Inc., 440 Jefferson Avenue, East, Detroit, has been organized with \$500,000 capital stock to take over the business of H. Scherer & Co., which has been established for 50 years as distributor of iron, steel, and heavy hardware. It is agent for the Detroit Forging Co.

The National Fire Extinguishing Co., West Chester, Pa., has been organized to manufacture fire extinguishing apparatus. It has a plant located at Green Hill Station and will do its own manufacturing. C. M. Burdette is president, E. W. Hanks, vice-president and E. H. Jacob, treasurer.

The Jamestown Sterling Corporation, Jamestown, N. Y., has been organized to manufacture metal and other furniture. Plans are indefinite as yet. Address is in care of Jude, Blackmon & Johnson, 400 Wellman Building, Jamestown.

The Utility Trailer Works, Inc., 308 Lee Street, Montgomery, Ala., has been organized to manufacture lumber trailers, from 1 to 3½ tons capacity. Plans have been outlined and are being worked out. W. H. Metcalf is secretary-treasurer.

The Gatch Wire Goods Co., 801 Buren Street, Baltimore, has been incorporated with capital stock of \$200,000 to manufacture wire specialties. Operations are under way. M. W. Gatch, president of the company, was with the Bromwell Brush & Wire Goods Co., Cincinnati, for over 30 years.

Chewning & Wilmer, Inc., 1022 Hull Street, Richmond, Va., has been organized with \$25,000 capital stock to do electrical contracting and engineering. It will be in the market for such equipment as will be needed in contracting. G. C. Chewning and T. W. Wilmer head the company.

The Randomtex Dyeing Co., 192 West Division Street, Syracuse, N. Y., has been organized to manufacture machines for dyeing. It will be in the market for monometal tanks, iron vacuum tanks, electric motors and vacuum pumps. Manufacturing will be done by the Porter Cable Co. of Syracuse. A. G. Velasco, James L. Johnson and Henry Bowman are the principals.

The Colorado Springs Toy Co., Colorado Springs, Colo., has been organized with \$100,000 to manufacture mechanical toys. It has secured a plant and has completed the purchase of machinery and equipment. James V. Forbes is president.

The Wread Products Co., care of H. L. Grace, 824 Van Nuys Building, Los Angeles, Cal., has been organized with \$100,000 capital stock to manufacture metal products, mainly locks and builders' hardware.

The Radio & Battery Co., Wheeling, W. Va., has been organized to act as distributor of batteries and electrical equipment.

The Huntington Magneto Electric Co., 714 Fourth Avenue, Huntington, W. Va., has been organized with capital stock of \$50,000 to manufacture automotive electrical specialties, magnetos, etc.

The Coale Muffler & Safety Valve Co., 325-35 East Oliver Street, Baltimore, has been incorporated with \$200,000 capital stock to take over the business of a Delaware corporation which has been established since 1890 in the manufacture of locomotive safety valves, blower and blow-off valves. The company is in full operation. D. W. Bridges is treasurer.

The Art Stone Co., Sioux City, Iowa, has been organized with \$50,000 capital stock to manufacture cast stone and concrete products for building purposes. It has purchased

the business of the Hydro-Stone Products Co. of that city, has installed new machinery and now is in full operation. Carl J. Ludwig is general manager.

The Little Falls Engineering & Equipment Co., Little Falls, N. Y., has been organized to do a general engineering and contracting business. J. C. Bronner is one of the principals.

The Dirigold Corporation, 728 Metropolitan Bank Building, Minneapolis, will lease a plant or purchase one in Minneapolis or St. Paul to manufacture tools and machinery, specializing in dirigold and alcobronz. The company was incorporated with \$1,100,000 capital stock. It has a factory in Sweden. Victor J. Wallin is vice-president.

The Daniels Ornamental Iron & Wire Corporation has been incorporated with capital of \$36,000 authorized, in Birmingham, Ala. W. H. Daniel is president and treasurer, and the only ornamental iron and wire works in the district has been taken over and will be expanded. A larger plant will be erected at once. The industry was started seven years ago by Mr. Daniel and now has three usual sized store rooms, manufacturing ornamental iron and wire.

The Lakeside Steel Improvement Co., 5418 Lakeside Avenue, N. E., Cleveland, has been organized to engage exclusively in the commercial heat treating and hardening business. The management consists of men formerly employed by the Steel Improvement & Forge Co., whose plant, equipment and business the new company has acquired. The latter company will confine its efforts to the manufacture of drop forgings. The plant is equipped and in full running order for handling small or large quantities of parts from its own siding.

The Strong Trading Co., Wichita, Kan., will act as distributor of a new centrifugal threshing machine and other farm equipment. H. L. Strong is manager.

The Kentucky Viking Sprinkler Co., 601 Lincoln Bank Building, Louisville, Ky., has been organized to contract for the installation of automatic sprinkler systems. It is a licensee of the Viking Corporation, Hastings, Mich. J. C. Watkins is president of the new company.

The Auto Resilience Mfg. Co., 1406 Dickinson Street, Philadelphia, has been organized with capital stock of \$500,000, as successor to the company by that name formed in 1921 to manufacture automotive equipment. Capital increase was effected in order to increase production from 20 to 500 sets per day. Main office and factory are at 465 York Street, Detroit. C. J. A. Delgado is one of the heads.

Frank P. Neal and C. W. Larsen have organized the Red Point Mfg. Co., with a plant at Illinois and Franklin Streets, Chicago, to manufacture and merchandise brass jacket drive well points, brass artesian cylinders and other water well supplies. Mr. Neal was for 22 years with the Mark Mfg. Co. and the Steel & Tube Co. of America, latterly as assistant general sales manager, and recently was identified with the Youngstown Sheet & Tube Co. Mr. Larsen was associated with the Mark Mfg. Co. and the Steel & Tube Co. of America sales organizations for 27 years.

The Jiffy Auto Chain Co., Watertown, N. Y., has been formed to distribute a chain now being manufactured by the Watertown Engine & Boiler Works. F. Pettit is president; Dr. F. R. Calkins is vice-president; Walter McArthur, secretary and treasurer; T. R. Hendricks and C. Courtney, directors.

The Duraloy Co., 47 Terminal Way, Pittsburgh, South Side, recently was organized to carry on the exploitation of duraloy metal, formerly produced by the Cutler Steel Co. at its plant in New Cumberland, W. Va., now in process of liquidation. Duraloy castings are being produced at the plant of the Eastern Steel Castings, Newark, N. J., where is located the eastern office of the Duraloy Co., with W. F. Furman in charge. Arrangements are in progress for the production in the Pittsburgh district of rolled duraloy products. Thomas R. Heyward, Jr., heads the new company.

Real estate and personal property of the Herschell-Spillman Motor Co., Tonawanda, N. Y., was sold in bankruptcy court, Lockport, N. Y., May 9, by Referee George D. Judson to the Simonds Machine & Tool Co. for \$190,000. The sale included the heating, lighting and sprinkler systems.

Negotiations have been completed whereby the property of the T. R. Brien Foundry Co., Westfield, Mass., is to be taken over by a Springfield, Mass., manufacturer of electrical appliances.

Industrial News Items

The Newark Wire Cloth Co., Newark, N. J., has established itself in its new plant at 351-65 Verona Avenue. The new building covers about three quarters of an acre of floor area and is 100 x 310 ft. In addition to building new machinery, the company recently acquired a wire manufacturing concern of long standing and has installed in its new building the machinery thus obtained. Its products include testing sieves, metallic filter cloth, foundry riddles, sifter cloths and straining cloths. These are made in all metals and in meshes from one space in 2 in. to 325 meshes to the inch. In the matter of ordering the company suggests sending samples of the exact requirements in order to avoid error.

Work has been started on a new building at 2501 North Keeler Avenue, Chicago, by the Illinois Tool Works, 154 East Erie Street, Chicago. It will be a one-story steel and brick factory building, with area of 60,000 sq. ft. and will cost approximately \$350,000. The area of the plot upon which it will be erected comprises about 180,000 sq. ft. According to plans the building will be completed in early fall. Products to be manufactured include high speed steel milling cutters, hobs and special tools. Puckey & Jenkins, 400 North Michigan Avenue, Chicago, are the architects. C. L. Johnson is secretary of the Illinois company.

The Hadfield-Penfield Steel Co., Willoughby, Ohio, manufacturer of machinery, industrial locomotives and gray iron castings, is planning to fill its entire requirements for gray iron and semi-steel castings in the Willoughby foundry. This will require some alterations and additions to present buildings and equipment. Some of these changes already are in process. To assist in taking care of the increased volume of work, John F. Gaffney, for many years in charge of foundries for the Allis-Chalmers Mfg. Co., Milwaukee, and the Bethlehem Steel Co., Sparrows Point, Md., has been employed as foundry superintendent.

The Westinghouse Electric & Mfg. Co., has leased the entire street floor of a warehouse at 11 Farnsworth Street, South Boston, from the Brown-Durrell Co., Boston, dry goods.

Canadian Scrap Market

TORONTO, ONT., June 3.—While iron and steel scrap dealers in Toronto and Montreal districts are looking forward to a stronger demand for these commodities, improved conditions have so far failed to materialize. Melters continue to buy on a hand-to-mouth basis with orders confined to small tonnages. Consumers are withholding contracts on third quarter account, but it is expected that mills will shortly be placing orders on this account, as operations have been steady, averaging around 70 per cent capacity. Foundry activities, however, are still backward, resulting in an average daily melt of only about 50 per cent. The movement of scrap on old contracts account continues active, as steel mills are taking in good tonnages of heavy melting steel and turnings. Machinery cast and malleable scrap have improved slightly, but on the whole the demand for these commodities is much below normal. Trading between dealers is fairly active, with buying chiefly of a speculative nature. Dealers' yards are well stocked with practically all lines of scrap and no shortage is expected. Local dealers say that they have had no inquiry for scrap for export for a considerable time and shipments across the border are at a standstill. While no change in prices has been announced, it is understood that dealers have been buying slightly below those quoted.

Dealers' buying prices are as follows:

Gross Tons		
	Toronto	Montreal
Steel turnings	\$9.00	\$8.00
Machine shop turnings.....	9.00	8.00
Wrought pipe	8.00	10.00
Rails	12.00	13.00
No. 1 wrought scrap.....	11.00	12.00
Heavy melting steel.....	11.00	10.50
Steel axles	14.00	18.00
Axles, wrought iron.....	18.00	20.00
Net Tons		
	Toronto	Montreal
Standard car wheels.....	13.00	14.00
Malleable scrap	14.00	14.00
Stove plate	15.00	15.00
No. 1 machinery cast.....	17.00	19.00

Machinery Markets and News of the Works

MAY A QUIET MONTH

Machine-Tool Business at the Lowest Point of the Year

Inquiry in Chicago for 32 Speed Lathes for Technical High School

Machine-tool business reached a low point in May, which was the poorest month of the year so far. The last week of the month was particularly dull in nearly all markets, the holiday at the end of the week contributing to some degree to this condition.

With many manufacturing plants reducing operations, all of the equipment on hand is not being fully employed, hence the demand for tools for replacement purposes is very small. The most important buying, in dollars, is still being done by the railroads.

The New York Central is continuing its purchases of one or two machines at a time. The Big Four has bought several tools for its Beech Grove, Ind., shops. The Santa Fe, Burlington, Norfolk & Western and Southern railroads are expected to take action shortly on pending lists.

The Chicago Board of Education is inquiring for 32 12-in. motor-head speed lathes and a number of wood-working machines for the Tilden Technical High School in that city.

New York

NEW YORK, June 3.

ASIDE from the purchase of a few tools by the General Electric Co. and the Otis Elevator Co., there has been no machine-tool buying worthy of mention the past week. An order for a 5-ft. vertical boring mill came to an Eastern builder from the Latex Iron & Steel Co., Birmingham. Japanese interests bought a 2000-lb. steam hammer. Inquiries are few in number and orders, even for single tools, are scarce. Eastern industrial plants are nearly all running at a reduced rate of operation and are not using all of the machine-tool equipment they now own.

The secretary, Public Works Supplies and Tenders Committee, Wellington, New Zealand, will take bids until July 15, for 12 substation transformers for the Waikato power scheme.

Charles Kohler, 601 West Fiftieth Street, New York, piano manufacturer, has plans for a new seven-story factory, 100 x 150 ft., at 609-15 West Fifty-first Street, to cost about \$300,000, with machinery. Russell G. Cory, 30 Church Street, is architect.

The Electrical Equipment Division, Bureau of Foreign and Domestic Commerce, Washington, has information regarding a proposed hydroelectric generating plant on the Villa River, near Kovno, Lithuania, for which representatives are now in the United States to look over equipment and consult with contractors, File No. 130,614.

The Carroll Contracting Co., Lincoln Place, Ossining, N. Y., is in the market for a 10-ton road roller, portable steel hopper and other equipment.

The Bureau of Yards and Docks, Navy Department, Washington, has plans and specifications under way for extensions and improvements in the naval coaling plant at Cavite, P. I., specifications 4990; also for a steel water tank at Guantanamo, Cuba, specification 4977 and for an elevated water tank at Pearl Harbor, P. I., specification 4992.

Murray Klein, 39 Graham Avenue, Brooklyn, architect and engineer, has completed plans for a seven-story automobile service, repair and garage building, on West 134th Street, New York, 100 x 150 ft., to cost \$550,000 with equipment.

The Transit Commission, 49 Lafayette Street, New York, will soon begin the erection of an inspection shop with repair facilities in the Bronx, to cost \$100,000 with equipment.

The Industrial Machinery Division, Bureau of Foreign and Domestic Commerce, Washington, has information regarding a mechanical coal-loading plant to be installed by the port authorities, Recife, Pernambuco, Brazil, estimated

to cost \$287,000. A traveling gantry crane will be purchased, with clam shell buckets and other equipment, including conveying and hoisting apparatus, No. 128914.

Brennan, Mattheis & Trigge, 2001 Anthony Avenue, New York, have plans for a two-story automobile service, repair and garage building, 100 x 100 ft., estimated to cost \$100,000 with equipment.

The B. & J. Auto Spring Co., 142 Clifton Place, Brooklyn, will rebuild the portion of its works destroyed by fire May 21 and replace damaged equipment. An official estimate of loss has not been announced.

The Department of Plant and Structures, Municipal Building, New York, plans the installation of an ice-manufacturing and refrigerating plant in the new market and storage building in the Bronx, for which a general contract has been awarded to the Niewenhous Co., Inc., 316 East 161st Street, to cost \$2,850,000.

The American Consulate, Prague, has information regarding a steel and iron company of that city in the market for American drop forge equipment for the production of railroad car and automobile axles, agricultural apparatus, etc.; also for molding machines and other equipment for an iron foundry. Catalogs and information have been requested and should be addressed to the Acting Commercial Attaché, H. Lawrence Groves, Obecni Dum, Prague, Czechoslovakia.

The Public Service Electric Corporation, Jersey City, N. J., will build a two-story addition to its power plant at the foot of Duffield Avenue, estimated to cost \$125,000.

Manual training equipment will be installed in the three-story high school to be erected on Sunset Avenue, Asbury Park, N. J., estimated to cost \$800,000, for which bids are being asked on a general contract until June 18. E. A. Arend, 105 West Fortieth Street, New York, is architect. Douglas, Sprague & Slocum, 50 East Forty-first Street, New York, are consulting engineers for mechanical and engineering equipment.

The J. Wiss & Sons Co., 31 Littleton Avenue, Newark, N. J., manufacturer of knives, cutlery, etc., has purchased the plant of the Valley Forge Cutlery Co., in the vicinity of its works, consisting of two four-story, two one-story and a three-story building, totaling about 58,000 sq. ft. of floor space. It will be used for immediate expansion. Fred J. Wiss is president.

The State Highway Commission, Broad Street Bank Building, Trenton, N. J., is taking bids until June 12 for six 30-ton capacity each, suspension-bearing, motor truck weighing scales, and for one 40-ton capacity scale. A. Lee Grover is secretary.

A large British firm wishes to purchase through its representative, Mr. Collins, 349 Broadway, New York, quantities of new and second-hand screwed and socketed tubes, 2-in. to 6-in., and also welded loose-flanged tubes.

The Crane Market

WHILE there are a number of active inquiries for overhead traveling cranes, expected to close at any time, few purchases are noted this week. The locomotive crane market is also inactive, although sellers are quoting on a fair volume of inquiries. Among the inquiries, upon which action is expected before long is the 100-ton crane for the Utica Electric Light Co., to be bought by Thomas E. Murray, New York; four 20-ton electric cranes for the Long Island Railroad; a bucket crane for the Indiana Electric & Mfg. Co., Macksville, Ind., to be bought by Stone & Webster, Boston; a 25-ton crane for the New York Transit Corporation, Brooklyn, N. Y. The American Smelting & Refining Co., New York, has closed on a 25-ton, 30-ft. span, 4-motor overhead crane with 5-ton auxiliary for a smelter in Peru. This is the second overhead crane purchased recently, the previous purchase being a 10-ton, 100-ft. span overhead crane. The Supply Officer, Brooklyn Navy Yard, Brooklyn, N. Y., is offering for sale a 5-ton, 96-ft. 7-in. span Chesapeake overhead traveling crane, bids opened June 5.

The McCarter Iron Works, Inc., Norristown, Pa., is in the market for a used 5 to 10-ton, 30 to 40-ft. span overhead traveling crane with runway of 150 to 300 ft.

Crane business has lately been fairly good in the Pittsburgh district. Westinghouse Electric & Mfg. Co., has placed seven of the 12 cranes it inquired for some time ago for its transformer plant at Sharon, Pa., and is expected to place the other five soon.

Among recent purchases are:

Westinghouse Electric & Mfg. Co., a 75-ton and a 50-ton, 80-ft. span crane from the Morgan Engineering Co., a 30-ton, 80-ft. span crane from the Cleveland Crane & Engineering Co., three 15-ton, 56-ft. span and one 15-ton, 75-ft. span crane from the Alliance Machine Co.

Blaw-Knox Co., Pittsburgh, a 5-ton trolley, from the Cleveland Crane & Engineering Co.

American Sheet & Tin Plate Co., a 50-ton, 80-ft. span overhead crane with 10-ton auxiliary for its Wellsville, Ohio works, from the Alliance Machine Co.

Pennsylvania Glass Sand Co., Lewistown, Pa., a 5-ton electric traveling crane and a 20-ton hand power crane, from the Northern Engineering Works.

Austin, Ford & Son, Cambridge, Mass., a 15-ton overhead traveling crane, from the Lane Mfg. Co.

De Mattia Brothers, Garfield, N. J., two 5-ton, 40-ft. 10-in. span used Pawling & Harnischfeger cranes, from a dealer.

Putnam Foundry & Machine Co., Putnam, Conn., six 3-ton overhead and jib hand power cranes, 30-ft. spans, from the Whiting Corporation.

General Electric Co., Schenectady, N. Y., a 10-ton, electric traveling crane for Fort Wayne, Ind., from the Whiting Corporation.

Columbia Machine Works & Malleable Iron Co., Brooklyn, N. Y., a $\frac{3}{4}$ -cu. yd. bucket for a revolving gantry crane, from Edgar E. Brosius, Pittsburgh.

Philadelphia

PHILADELPHIA, June 2.

THE General Electric Co., Schenectady, N. Y., has awarded another general contract to the Turner Construction Co., 244 Madison Avenue, New York, for a six-story building at its South Philadelphia Works, Sixty-eighth Street and Elmwood Avenue, 80 x 604 ft., estimated to cost \$1,000,000, with equipment. Other buildings will be erected later. A portion of the plant will be used for the manufacture of high-voltage oil circuit-breakers.

The City Council, City Hall, Philadelphia, has leased a structure at Twenty-first and Market Streets, to be remodeled for a municipal service, repair and garage building. A new Bureau of Automobiles is being created by the Council.

George H. Biles, director Bureau of Water, City Hall, Philadelphia, will take bids until June 10 for one steam turbine generator and auxiliary equipment, Contract No. 685; also for a quantity of soot blowers, Contract 678.

Work has begun on a two-story plant, 45 x 70 ft., at Thirteenth and Hamilton Streets, Philadelphia, for the manufacture of safety mechanical devices for elevator and other service, for Frank C. Holdberg, Jr., now operating a plant at 1011 Chestnut Street.

The Foreign Trade Bureau, Philadelphia Commercial Museum, has received an inquiry from a party at Osaka, Japan, desirous of getting in touch with a manufacturer of bicycle chains, for which a local client is in position to place orders annually to an amount of \$100,000. It is proposed to purchase the links and parts only, assembling at a Japanese works, No. 42348.

Jones-Beach & Co., 50 North Seventh Street, Philadelphia, manufacturers of electric supplies and equipment, has taken title to the factory at Seventh and Wood Streets for \$130,000 and will remodel the structure for a new plant.

Manual training equipment will be installed in the new junior high school to be erected at Trenton, N. J., estimated to cost \$400,000, for which bids are being asked on general contract until June 20. Ernest Sibley, Palisade, N. J., is architect; and William A. Klemann, 32 East State Street, Trenton, associate architect. The Committee on Supplies and Printing, Administration Building, 9 South Stockton Street, is asking bids until June 12 for school equipment, including manual arts equipment (Schedule C); science furniture (Schedule Aa).

The Atlantic City Railroad Co., Atlantic City, N. J., has plans for the construction of two automatic power substations, at Atlantic City and Hammonton, N. J., respectively and will soon begin work. The cost is estimated in excess of \$80,000, with equipment.

The Carpenter Steel Co., Exeter Street, Reading, Pa., is perfecting plans for a one-story addition, estimated to cost \$200,000 with equipment. Fred A. Muhlenberg, Ganster Building, is architect.

The Lenape Hydraulic Pressing & Forging Co., Lenape, near West Chester, Pa., recently organized, has taken over the power house of the West Chester Street Railway Co.,

which it is remodeling for the manufacture of wheels for the Ellis Resilient Wheel Corporation and affiliated interests.

The Berwick Lumber & Supply Co., Berwick, Pa., will begin the erection of a new planing mill to replace a structure destroyed by fire a number of weeks ago. It is proposed to install electrically-operated equipment.

The Prison Industries Board, Harrisburg, Pa., is perfecting plans for the installation of a concrete and cement block manufacturing plant at the Rockview Penitentiary. It will also be equipped for the production of concrete tile for highway service.

The Reading Sheet Metal Products Co., Front and Chestnut Streets, Reading, Pa., organized with capital stock of \$25,000 to manufacture sheet metal products for the automotive trade, has leased a plant for assembling and will manufacture by contract. E. S. Vandemark is president.

Pittsburgh

PITTSBURGH, June 2.

MAY was not a much better month in machine tool sales than April, and with some of the trade not as good. New lists have been few, and action against those which came out previously was deferred in all cases. Single tool business has been only fair. The trade earlier in the year made quotations on a sufficient number of inquiries to indicate a good year, but with the recession in business in general, there has grown up a strong spirit of caution, which has left many inquiries still pending.

The Mitchell Spring & Mfg. Co., Johnstown, Pa., recently organized by interests connected with the Fort Pitt Spring & Mfg. Co., John Street, Pittsburgh, has taken over the plant and business of Mitchell Spring Works, 820 Horner Street, Johnstown, and will expand the plant for the manufacture of coil and elliptic springs for electric and steam railroad equipment. Fred A. Meckert, general manager of the Fort Pitt company, heads the new company; W. G. Mitchell is vice-president, and Harvey Mitchell, treasurer. Joseph Irwin, formerly superintendent at the Fort Pitt plant, will act in a similar capacity at the Johnstown works.

George W. Gerwig, secretary Board of Education, Pittsburgh, will take bids until June 16, for manual training supplies for the David B. Oliver high school; also, for steel lockers, steel shelving and similar equipment for this and other high schools. Specifications on file at the office noted, or that of the superintendent of supplies, 701 Fulton Building.

The Low Ash Mining Co., Excelsior, W. Va., has tentative plans for rebuilding the portion of the power plant at its properties, recently destroyed by fire with loss estimated at \$17,500, including equipment.

The Crane Co., 836 South Michigan Avenue, Chicago, has awarded a general contract to the Roush Brothers Co., 1040 Charleston Street, Charleston, W. Va., for its local

factory branch and distributing works on Broad Street, 70 x 150 ft., to cost \$50,000. Wysong & Jones, Professional Building, are architects.

The Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has work in progress on additions to its plant at Creighton, Pa., to include the installation of considerable equipment and to cost \$250,000.

The Raleigh Coal & Coke Co., Raleigh, W. Va., is said to have plans under advisement for rebuilding its local tippie No. 5 recently destroyed by fire. An official estimate of loss has not been announced.

The Sharpnack Lumber Co., Inc., 1015 First National Bank Building, Huntington, W. Va., recently organized with a capital of \$200,000, is perfecting plans for the installation of a number of lumber mills to develop its holdings in Tazewell County, with powerhouses and steam-operated equipment.

The Westinghouse Electric & Mfg Co., East Pittsburgh, is said to have plans for the erection of a factory branch and distributing works at Denver, Colo., estimated to cost \$500,000 with equipment.

The Indiana Township Light Co., the Hampton Township Light Co., the O'Hara Township Light Co., and the Harmar Township Light Co., have been organized by the same interests to construct and operate plants and systems in the respective territory for which named. Application for a State charter will be made on June 30. The companies are all headed by J. R. McNary, P. H. McClance, and E. E. McCormick and are represented by A. W. Robertson and R. J. McNary, 435 Sixth Avenue, Pittsburgh.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, has plans for the erection of an addition to its plant at Tiffin, Ohio, to cost \$45,000 including equipment. G. W. Netcher, South Washington Street, Tiffin, is architect.

Chicago

CHICAGO, June 2.

MAY was probably the poorest month in machine tool sales thus far this year. Dealers, however, find encouragement in a number of good sized individual orders booked the past week. The Green Engineering Co., East Chicago, Ind., has purchased a diamond face grinder, while the Advance-Rumely Co., Laporte, Ind., has placed an order for a 30-in. gear tooth rounder. The Department of Public Works, Chicago, has closed for a 16-in. x 6-ft. engine lathe and a 24-in. upright drill. Notwithstanding slower operations in the automobile industry, the Nash Motor Co. continues to buy a few tools from time to time to complete its manufacturing equipment.

There have been no new orders from the railroads, but both the Santa Fe and the Burlington are expected to take early action on their respective lists. The Chicago Board of Education has put out inquiries for 32 12-in. motor-head speed lathes for the Tilden Technical High School, besides a number of wood-working machines as follows: One motor-driven mortising machine, two motor-driven 6-in. portable hand planers and jointers, four motor-driven variety oilstone tool grinders, one motor-driven 20-in. hand planer and jointer, and six electric glue pots.

The recent auction of the equipment of the Universal Tractor plant at Rock Island, Ill., drew a large number of bidders, and prices obtained ranged from poor to good. A few consumers, notably the Great Western Mfg. Co., Leavenworth, Kan., bought, but for the most part the successful bidders were machine tool dealers from Chicago, Cleveland and elsewhere.

The Acme Addressing & Circular Letter Co., 1120 West Thirty-fifth Street, Chicago, has awarded a contract for a two-story factory, 50 x 100 ft., at 1132-4 West Thirty-fifth Street, to cost \$25,000.

The Apollo Metal Co., LaSalle, Ill., manufacturer of nicked, coppered and brass finished sheets, strips and circles for stamping, forming, pressing, etc., will erect an addition which will triple its present floor space.

The Blackhawk Foundry & Machine Co., Davenport, Iowa, has purchased a tract, 109 x 300 ft., adjoining its present plant as a site for a one-story foundry.

The Healy-Ruff Co., Minneapolis, Minn., will construct a foundry for the manufacture of radiator hangers at Water and Walter Streets on the Riverview levee, St. Paul, at a cost of \$25,000. The company's headquarters will also be moved to St. Paul.

The Calumet Steel Tank Co., an offshoot of the B. F. Freeland Sons' Co., Sturgis, Mich., is completing a new plant in Hammond, Ind., and will soon be ready for the installation of machinery. Products to be manufactured include galvanized steel stock watering and storage tanks, sheep and hog dipping tanks, garage cans, wagon tanks, steel mortar mixing boxes, coal chutes, concrete mixers, gasoline and oil tanks, etc.

The Union Metal Products Co., 20 West Jackson Boulevard, Chicago, manufacturer of car ends and roofs, has taken over the Keith Railway Equipment Co.'s plant at Hammond, Ind., and will use it for turning out forgings, patterns and ends. The company also has a plant at Pittsburgh.

The National Retarder Co., manufacturer of stucco retarder, 130 North Wells Street, Chicago, has purchased 43 acres in a triangular tract bounded by the Joliet Road, the Santa Fe Railroad and the Indiana Harbor Belt Line in Lyons Township, Ill., and will soon start the construction of a new plant to be built in steel units, 40 x 100 ft. each. Definite plans as to the number of the units have not been decided upon.

The Electric Storage Battery Co., Philadelphia, with Chicago office at 140 South Dearborn Street, manufacturer of Exide batteries, has awarded a general contract for a two-story plant with 100,000 sq. ft. of floor space on the Western Boulevard, Chicago, north of Forty-seventh Street, to cost \$250,000.

The J. H. Williams Co. plant, West Pullman, Ill., was sold at auction on May 26 to J. H. Van Villissingen & Co., real estate, 39 South La Salle Street, Chicago, at a price of \$738,000. The buyer acted for a syndicate, the identity of which has not been divulged. It was not bought for the International Harvester Co., as has recently been rumored.

The Invincible Blow Pipe Co., 1822 North Lamon Street, Chicago, recently incorporated with \$20,000 capital stock, will manufacture blow pipe and sheet iron work and has leased 21,000 sq. ft. of floor space at the address given. The company is in the market for a number of metal working machines. Officers are Otto Butzbach, president; D. Bell, treasurer, and A. H. Anderson, secretary.

Dust conveying, blowing and other equipment will be required in connection with rebuilding the plant of the Shavings & Sawdust Co., South Western Avenue and West Twenty-third Street, Chicago, which was destroyed by fire May 27 with a loss of \$300,000.

The Nebraska Power Co., Electric Building, Omaha, Neb., has preliminary plans for a new automatic power substation at Twenty-second and M Streets, to cost about \$175,000 with machinery. J. E. Davidson is general manager.

Penick & Ford, Ltd., Whitney Building, New Orleans, manufacturer of starch, food products, etc., has plans for additions to its branch plant at Cedar Rapids, Iowa, to cost about \$1,500,000, with machinery, which will include crystallizers, mechanical dryers, centrifugals, double hammer separators, conveying apparatus, presses, mills, etc. Fred Friedline, Kentland, Ind., is architect and engineer.

The Mendota Mfg. & Transfer Co., Mendota, Ill., manufacturer of farm implements, etc., has begun the erection of a one-story machine shop, 50 x 100 ft., to cost \$20,000 with equipment.

The General Repair & Machine Co., 836-38 West Kinzie Street, Chicago, is planning for the establishment of new works to replace the portion of its plant recently destroyed by fire. An official estimate of loss has not been announced.

Joseph T. Ryerson & Sons, Inc., Sixteenth and Rockwell Streets, Chicago, is in the market for a second-hand Detrich & Harvey open-side planer, about 36 x 36 in. x 8 ft., with one rail head and one side head.

J. M. Dillon, Sterling, Ill., is in the market for a 2-in. upsetting and forging machine, with steel bed; a 200-lb. Bradley helve hammer, and a No. 74½ Bliss geared trimming press.

Buffalo

BUFFALO, June 2.

MACHINE-TOOL business during the past week was slow. The number of new machines sold has been small and even transactions in used tools have not been quite up to normal. Dealers do not look for improved business for some weeks.

The Walker Bin Co., Penn Yan, will erect a two-story addition containing two machine room floors of 15,750 sq. ft. each. It manufactures store fixtures.

The Lundell-Eckberg Mfg. Co., Jamestown, N. Y., manufacturer of metal window frames and other metal products has increased its capital stock from \$25,000 to \$100,000 and is negotiating for a new brick factory on Market Street.

The Art Metal Construction Co., Jones and Gifford Avenue, Jamestown, N. Y., manufacturer of metal furniture, has acquired property adjoining its main plant and has preliminary plans under way for the erection of an addition. M. Riehl is general manager.

The plant of the defunct Birmingham Motors Corporation, Falconer, N. Y., has been acquired through purchase from Otto Dill, Kane, Pa., by the Metal Safety Railway Tie Co., 202 Cherry Street, Jamestown, N. Y., which will utilize the works for the manufacture of a new departure in railroad tie equipment.

The Syracuse Supply Co., Syracuse, N. Y., plans to purchase a 36-in. Bullard New Era type boring mill and a 42-in. Colburn latest type heavy duty boring mill, one turret and one swivel head, motor drive preferred.

A one-story power plant will be erected at the new mill of the Derbrah Silk Corporation, Military Road and Skillen Street, Buffalo, for which plans have been filed. The entire project will involve about \$110,000.

Manual training equipment will be installed in the new two-story Columbus junior high school to be erected at Broad Avenue and Robinson Street, Binghamton, N. Y., estimated to cost \$500,000, for which a general building contract has been let to Tiffany & Kaley, Phelps Building, foundations to be laid at once. T. I. Lacey & Sons, Kilmer Building, are architects.

The Line Material Co., South Milwaukee, Wis., manufacturer of electric transmission and distributing line apparatus, is completing arrangements for a factory branch and distributing plant at 204 Burnett Avenue, Syracuse, N. Y.

E. S. Francis, 49 Georgetown Street, Buffalo, is planning for the early purchase of equipment for installation in a wood-working and cabinet manufacturing plant.

The Elmira Water, Light & Railroad Co., Elmira, N. Y., is concluding arrangements for a lease of the municipal electric lighting plant at Burdette, N. Y., and will make extensions in this section.

Cincinnati

CINCINNATI, June 2.

THE past week has been quiet in machine tool circles. Reports of a large purchase of tools for shipment to Japan are current, but as yet no definite information has been received about the placement of any large orders. Some buying has been done by the Japanese Navy Department, however, and a large order for milling machines is said to have been placed in this country. Inquiry continues fair and local dealers report that business in May was fully up to the average for the preceding months of the year. Used machinery continues in good demand.

The Big Four Railroad closed with an Indianapolis dealer for a number of tools for its Beech Grove shops, and the New York Central is continuing its purchases of one and two machines at a time. The Southern Railroad is expected to take quick action on its new list of tools for Birmingham shops. The Louisville & Nashville has not closed on hydraulic machinery recently inquired for.

The International Steel Wool Corporation, Springfield, Ohio, has been incorporated with a capitalization of \$30,000 to manufacture steel wool by a newly patented process. The company plans to erect a manufacturing building, but has not definitely selected a site. J. K. Williams is president.

The Associated Bodies Corporation, Louisville, Ky., has been organized with a capitalization of \$1,000,000 to manufacture truck and bus bodies and will take over a plant in the Louisville district now engaged in building bodies. R. P. Monroe, formerly president Monroe Body Co. of Pontiac and Detroit, and a director of the Mengel Body Co., Louisville, is president of the new company.

The V. W. Ventilator Co., manufacturer of metal ventilators, 485 East Livingston Avenue, Columbus, Ohio, has acquired property on Rich Street, and contemplates erecting a two-story building. Joseph C. Goodman is president.

The Columbus Railway, Power & Light Co., North Third Street, Columbus, Ohio, will begin the erection of a one and two-story addition to its power plant on East Gay Street, 50 x 125 ft., estimated to cost \$130,000. A building contract has been let to the Spencer Co., 910 Huntington Bank Building.

The Appalachian Marble Co., Knoxville, Tenn., is in the market for a steel derrick, with 100 ft. boom, capacity about 10 tons, with bull wheel, mast, etc., an engine for operation and another engine unit to operate a 30-ton derrick.

The Davis Welding Co., 1110 Richmond Street, Cincinnati, has filed plans for a one-story addition on Llewellyn Avenue, to cost \$95,000 with equipment, for which a general contract has been let to M. R. Hanke, Cincinnati.

The Kentucky-Tennessee Power Co., Hopkinsville, Ky., has acquired the municipal electric plant at Dresden, Tenn., and will make extensions and improvements.

Detroit

DETROIT, June 2.

THE Ford Motor Co., Detroit, has awarded a general contract to the F. K. Vaughn Building Co., Dayton Street, Hamilton, Ohio, for a one-story addition to its Hamilton forge works, estimated to cost \$90,000 with equipment. Albert Kahn, Marquette Building, Detroit, is architect.

The city clerk, Jackson, Mich., will receive bids until July 2 for a high service pumping plant for the municipal waterworks, including boiler house, coal trestle and storage facilities, radial brick stack, etc. J. E. Whittaker is city manager.

Charles K. Warren and J. J. Theisen, Three Oaks, Mich., are organizing a company to build and operate a brick manufacturing plant at St. Joseph, Mich., with mechanical dryer equipment, power house and machine shop, estimated to cost \$100,000 including equipment.

The Huron Portland Cement Co., Wyandotte, Mich., has begun the erection of an addition to its local mill to cost close to \$250,000, and is expected to be ready for service by the end of the year. John B. Ford is president, and S. T. Crapo, secretary and treasurer.

The Fenton Machine Tool & Die Co., Fenton, Mich., is perfecting plans for a one-story factory on site lately purchased, 90 x 180 ft., for the manufacture of metal stampings, dies, jigs, etc., estimated to cost \$45,000 with equipment.

P. H. Beauvais, city manager, Royal Oak, Mich., has issued another call for bids for the construction of a pumping plant and disposal works for the sewage system, for which bids recently received have been rejected. The new figures will be received until June 10, to include complete machinery. Hoad, Decker, Shoecraft & Drury, Ann Arbor, Mich., are consulting engineers.

The Detroit Edison Co., Detroit, has filed plans for a two and three-story automatic power substation on Trombley Street, estimated to cost \$135,000 with equipment.

E. J. Roberson, 502 Genesee Bank Building, Flint, Mich., is organizing a company and will soon begin the erection of a two-story plant at Mount Morris, Mich., 100 x 150 ft., for the manufacture of caskets. It will include a power house and is estimated to cost \$200,000 with machinery.

The Michigan Copper & Brass Co., 5851 West Jefferson Street, Detroit, has filed plans for a one-story addition, 85 x 420 ft. Lane, Davenport & Peterson, Dime Bank Building, are architects.

Cleveland

CLEVELAND, June 2.

THE volume of machine tool sales continues light and no inquiry of any size came out during the week. The only railroad business reported is the purchase of a turret lathe by the Boston & Albany from a Cleveland manufacturer. May sales with most dealers and manufacturers fell below those of April. Business the past month was confined to scattering orders, mostly for single machines and few of which were for more than two tools. Dealers have a few fair prospects which have been pending for some time from industrial companies continuing to defer purchases. Very little business is coming from automobile and parts manufacturers.

The Sanymetal Products Co., Cleveland, has acquired the plant of the MacLaren Iron Works Co., Urbana Road, Northeast, and has moved to its new quarters. The American Stamping Co., now at 5400 Windsor Avenue, is moving into the plant at 6332 St. Clair Avenue, formerly occupied by the Sanymetal Co.

The National Malleable Casting Co., Cleveland, will erect a two-story addition, 50 x 45 ft., to its Toledo plant.

The Industrial Machine Co., 2160 Superior Avenue, manufacturer of special machinery, has placed contract for the erection of a one-story factory, 70 x 130 ft. The company advises that it is well supplied with equipment and will not buy any additional machinery.

The village of Wadsworth, Ohio, has awarded a general contract to the Lodi Concrete Co., Lodi, Ohio, for a sewage

disposal plant which will include filtering and other equipment.

A manual training department will be provided in a high school to be built in Sunbury, Ohio. P. S. Stanforth is clerk of the Board of Education.

The village of Wickliffe, Ohio, is contemplating the erection of a sewage disposal plant. J. M. Crabbes, Court House, Painesville, Ohio, is engineer.

Loudonville, Ohio, has awarded a contract for a new high school in which a manual training department will be provided. L. Kiplinger is clerk of the Board of Education.

Transformers, generators, boilers and other equipment for a power and light plant will be purchased by L. L. Jones and associates, who contemplate establishment of a local power and light plant at North Fairfield, Ohio, to cost \$10,000.

Milwaukee

MILWAUKEE, June 2.

DEVELOPMENTS the last week in May in foundries and machine shops disclosed further curtailment of production and working forces, and material retrenchment in the forces of railroad shops throughout the State. This has tended to make the general machine-tool trade more inactive and even inquiry has lessened. Manufacturers and dealers still cling to the belief, however, that the condition is only temporary and they look for a moderate amount of business during the summer.

The Schuler Motor Car Co. of Milwaukee, which was incorporated with a capital stock of \$1,000,000 several months ago, has purchased a modern factory and a site of 6½ acres at Schellsingerville, Wis., and will start retooling immediately. It will manufacture a light weight two passenger automobile, powered with a twin V-type gasoline engine. Financing has been effected, it is announced. Harry E. Schuler is president and chief engineer.

The McClymont Marble Co., 2700 Canal Street, Milwaukee, let the general contract to Meredith Brothers, 253 Washington Street, for a one-story cutting and polishing room addition, 66 x 137 ft., and smaller additions to several other buildings. Electric-motored tools, saws, grinders, etc., are being purchased. James J. McClymont is president and general manager.

The Board of Education, Waupun, Wis., is asking bids for the construction of a vocational training addition, 50 x 71 ft., part three stories, to the Waupun High school, estimated to cost \$55,000. The architects are Stepnoski & Mehner, Fond du Lac, Wis. H. S. Hemenway is principal.

The Milwaukee Lock Washer Co., established at 409 Chambers Street, Milwaukee, about a year ago, has incorporated under the same style, with an authorized capital of \$25,000. Enlargement of production will be effected at once, either by an addition to the present factory, or lease or purchase of an existing shop building. The principals are Alfred W. Mellows and Frank W. Regner.

The A. R. Investment Co., 290 Third Street, Milwaukee, has let contract for a one-story machine shop, 60 x 120 ft., at 1660-1664 Holton Street, to the Sterling Engineering Co., Metropolitan Block. The name of the occupant will not be made public for the present. C. J. Rice is president.

The West Allis, Wis., School Board is taking sealed bids until June 9 for the erection of an addition to the high school, at Sixty-seventh and National Avenues, part of which will be used for new manual training and domestic science departments. The architects are Robert A. Messmer & Bro., 221 Grand Avenue, Milwaukee. Fred H. Haker is president of the board.

St. Louis

ST. LOUIS, June 2.

SLATER BROTHERS, 60 North Gilette Street, Tulsa, Okla., have tentative plans for a new plant to manufacture oil-well supplies and equipment, including oil rigs, derricks, etc., estimated to cost \$50,000 with machinery. Guy P. Slater heads the organization.

Manual training equipment will be installed in the proposed two-story and basement high school to be erected at Webster Groves, Mo., estimated to cost \$400,000, for which bids will soon be asked on a general contract. W. B. Rtner, Board of Education Building, St. Louis, is architect.

The Roxanna Petroleum Corporation, Mayo Building, Tulsa, Okla., is perfecting plans for a new gasoline refinery in the vicinity of Stroud, Okla., to cost about \$75,000 with equipment.

The Sherman Machine & Iron Works Co., 32 East Main

Street, Oklahoma City, Okla., is perfecting plans for a two-story addition estimated to cost \$35,000.

Plans have been drawn for a one-story industrial building at the high school, Columbus, Kan., to cost about \$30,000. Mann & Co., Hutchinson, Kan., are architects.

The Crystal Ice & Ice Cream Co., Fayetteville, Ark., has plans for a new ice-manufacturing and ice cream plant to cost \$80,000 with equipment. A power house will be installed, with oil-burning engines and auxiliary apparatus.

The Common Council, Heavener, Okla., is perfecting plans for the installation of electric-operated pumping equipment in connection with extensions and improvements in the waterworks, for which bonds for \$45,000 have been voted. J. M. Page, Oklahoma City, Okla., is engineer.

Manual training equipment will be installed in the three-story high school to be erected at Parsons, Kan., estimated to cost \$500,000, for which bids will soon be asked on a general contract. Thomas W. Williamson & Co., Topeka, Kan., are architects.

Manual training equipment will be installed in the two-story and basement high school to be erected at Caruthersville, Mo., estimated to cost \$180,000, for which bids have been asked on a general contract. H. H. Hohenschild, Odd Fellows Building, St. Louis, is architect.

Gulf States

BIRMINGHAM, JUNE 3.

THE Westover Oil & Gas Co., Breckenridge, Tex., operated by the Hope Engineering & Supply Co., Farmers' Bank Building, Pittsburgh, is arranging for the erection of a new gasoline refinery, estimated to cost \$450,000, with equipment.

The Harbison-Walker Refractories Co., Farmers' Bank Building, Pittsburgh, will have plans completed at once for a new plant on property near Bessemer, Ala., acquired several months ago. It will consist of 6 kilns and a number of buildings, and is estimated to cost \$275,000 with machinery.

The American Refining Co., Wichita Falls, Tex., has acquired property at Alma and Wall Streets, Dallas, 140 x 300 ft., and plans the construction of a branch refinery.

Frank Davies, New Orleans, machinery dealer, has inquiries out for a steam shovel; also two locomotive cranes, one about 30 tons capacity and the other 60 tons, standard gage.

The Common Council, Davenport, Fla., plans the installation of centrifugal pumping equipment in connection with extensions in the municipal waterworks for which bonds have been voted.

Fire, May 23, destroyed a portion of the main mill and power house of the R. J. Williams Lumber Co., Poplarville, Miss., with loss estimated at \$200,000 including equipment. It is planned to rebuild.

The United States Engineer, Florence, Ala., will take bids until June 18, for screens, head gates, roller trains and other equipment for the power house at the Wilson Dam, Tennessee River. Full information on file.

The Mississippi Light & Power Co., Pine Bluff, Ark., has plans for the installation of a 3000 kw. generator and auxiliary equipment to increase production at the power station at Tupelo, Miss., recently acquired. C. P. Couch, Jackson, Miss., is vice-president.

The Texas Power & Light Co., Palestine, Tex., has acquired the plant of the Kerens Light & Power Co., Kerens, Tex., and plans for extensions and improvements, with additional equipment. The company will also make other additions in this district.

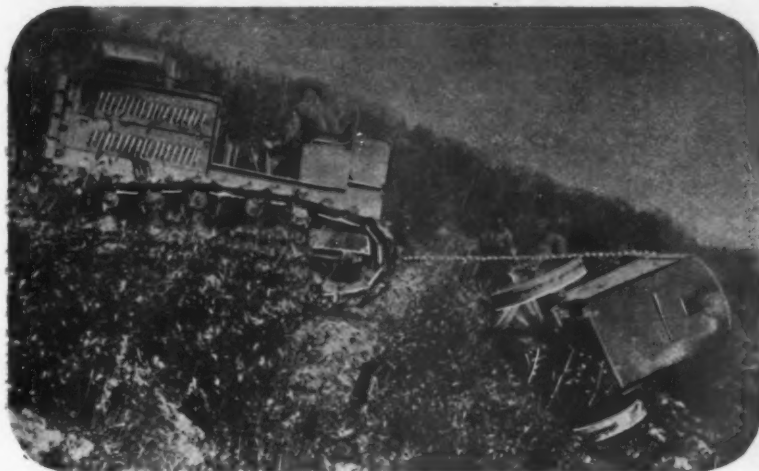
R. J. Irvine, Troup, Tex., is at the head of a project for the establishment of a local ice-manufacturing and cold storage plant, estimated to cost \$40,000.

The City Council, Huntsville, Ala., plans for the installation of centrifugal pumping equipment in connection with proposed extensions and improvements in the municipal waterworks, estimated to cost \$100,000, for which bonds have been approved.

The Southern Utilities Co., Bradentown, Fla., has secured a site on the Manatee River for a hydroelectric generating plant and will have plans prepared at once. It will cost approximately \$275,000 with machinery. T. D. Hayes is general manager.

The Batson & Hatton Lumber Co., Hillsdale, Miss., is planning the erection of a sawmill and steam power house in the vicinity of Lyman, Miss., where 50,000 acres was recently secured.

The McCorkle Pipe Line Co., 504 Burnett Building, Fort Worth, Tex., is perfecting plans for its proposed pipe line from Aransas Pass to San Antonio, Tex., about 430 miles.



A Test of the Durability of a Portable Compressor Under Difficult Conditions Is Reflected in the Travel History of the Machine Illustrated, Which Has Been Taken Nearly 10,000 Miles and Over Country Presenting Unusual Hardships.

It was expressed from Painted Post, N. Y., to Seattle, Wash., taken by ship to Bethel, Alaska, and then transported by barge up the Kuskokwim River to McGrath, where it was used by the Treadwell Mining Co., for a year. The machine was then taken overland to the Yukon River, loaded on a barge and taken up to Stewart, Y. T., and then to Mayo Landing. From the latter place it was hauled 50 miles by team and tractor, to Keno Hill, where it has been in use for over a year furnishing air for a No. 248 Leyner drill.

That the unit has not been twisted out of alignment in transit is attributed by the manufacturers of the machine, the Ingersoll-Rand Co., to mounting of the direct-connected gasoline engine and air compressor on a solid one-piece cast-steel frame.

The project will involve \$750,000, and will include the installation of a series of pumping plants. S. S. McCorkle heads the company.

The Miami Electric Light & Power Co., Miami, Fla., is said to be arranging an extension and improvement program to cost close to \$2,000,000, including additions to present generating plants and the installation of new machinery. H. H. Hyman is general manager.

The Gulf, Colorado & Santa Fe Railroad Co., Brownwood, Tex., has work in progress on its rock-crushing plant in the Hall Mountain section, and plans the early installation of continuous chain drags, conveyors and crushing machinery. A large steel classification bin will be built. It will cost \$40,000 with machinery.

The Magnolia Petroleum Co., Houston, Tex., has plans under way for rebuilding its tank farm in that city recently destroyed by fire with a loss of \$250,000. Pumping machinery, tanks, etc., will be required.

Indiana

INDIANAPOLIS, June 2.

THE Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, has rejected all bids for the erection of its four-story and basement factory branch and distributing works at Pratt and Senate Streets, Indianapolis, 80 x 150 ft., and will have revised plans drawn. It will cost \$180,000 with equipment. The Hunting-Davis Co., Century Building, Pittsburgh, is architect and engineer.

Kingan & Co., Indianapolis, operating a meat-packing plant, will begin the erection of a new cold storage plant to cost approximately \$200,000 with equipment.

The Statewide Engineering Co., Indianapolis, has acquired property at 539 North Capitol Avenue, and contemplates the early establishment of a plant to manufacture a line of engineering equipment.

The Owensboro, Rockport & Chicago Railway Co., E. F. Franks, president, 741 Frederica Street, Owensboro, Ky., has plans for the construction of an electric traction line from Owensboro to Elnora, Ind., about 85 miles, to cost approximately \$5,000,000. The project will include an electric generating plant and the installation of a number of automatic power substations. It is expected to begin work late in the summer. Thomas H. Hazelrigg, 1227 West Twenty-ninth Street, Indianapolis, is consulting engineer.

The Becker Motor Co., 201 West Jefferson Street, Fort Wayne, Ind., has awarded a general building contract to the Buesching-Hagerman Co., 401 Superior Street, for a three-story service, repair and garage building, 60 x 110 ft., to cost \$100,000 with equipment. Pohlmeier & Pohlmeier, Central Building, are architects.

Freeland & Whitney, Hammond, Ind., manufacturers of galvanized tanks, containers, etc., have awarded a general building contract to A. N. Hutson, Hammond, for a one-story addition, 45 x 100 ft.

The Board of School Commissioners, Indianapolis, is taking bids until June 10 for manual training equipment and supplies for five schools; also for 120 woodworking benches, desks, etc. Richard O. Johnson is business director.

Ira Holmes, 218 American Central Life Building, Indianapolis, is taking bids on a general contract until June 9, for a three-story and basement automobile service, repair and garage building, 60 x 195 ft., to cost \$85,000. John Hagel, 2632 East Tenth Street, is architect.

South Atlantic States

BALTIMORE, JUNE 2.

THE Seaboard Terminal Corporation, Baltimore, care of Jerome Sloman, Union Trust Building, attorney, has plans for an oil refining and distributing plant on 70 acres in the Curtis Bay section, previously held by the Chesapeake Shipbuilding Co., estimated to cost \$750,000 with machinery.

Robert Seft, 231 St. Paul Street, Baltimore, will begin the erection of a two-story automobile service, repair and garage building, 55 x 100 ft., on Monticello Avenue, to cost \$100,000 including equipment. General contract has been let to B. H. B. Ennis, 1933 Thirty-first Street.

The general purchasing officer, Panama Canal, Washington, will take bids until June 10, for 1000 ft. steel wire rope; 3000 ft. sewer pipe; 6 manganese steel dredge dipper lips; 240 ft. drawn steel tubing; 8 throttle valves; black and galvanized pipe fittings; steam specialties, etc., circular 2353; until June 19 for locomotive springs; wire; pumps; pneumatic hammers; chucks; tubing; steel pipe and joints; bolts; rivets; valves; wire cloth; chain blocks; shackles; turnbuckles, etc., circular 1613.

D. C. Elphinstone, Inc., 408 Continental Building, Baltimore, machinery dealer, has inquiries out for one 5-ton stiff-leg derrick, about 90 ft. boom; also for one 40 to 50-hp. horizontal return tubular boiler, and a number of 2-way dump cars, each about 4-yd. capacity.

The Common Council, Harrisonburg, Va., has plans under way for extensions in the municipal hydroelectric plant on the Shenandoah River, to replace recent damage, estimated to cost \$70,000. John F. Noll is superintendent of Public Works, in charge.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until June 10 for 5000 ft. seamless copper tubing, for the local navy yard, schedule 2271; until June 17 for 4400 lb. sheet aluminum, schedule 2266.

The G. B. Bright Co., 1112 Virginia Railway & Power Building, Richmond, Va., has inquiries out for 100 or more all metal, steam dryer cars, 24-in. gage, capacity about 600 brick per car.

The Southern Power Co., Charlotte, N. C., has plans for extensions in its hydroelectric generating plant on the Catawba River, near Fort Mill, S. C., to include the installation of new prime movers and auxiliary machinery. The power dam will also be increased in size. The project is estimated to involve about \$400,000.

The Caroline Foundry Co., 723 South Caroline Street, Baltimore, has acquired property on Dallas Street for about \$15,000 for proposed extensions.

L. F. Hobbs, Norfolk, Va., machinery dealer, has inquiries out for an electric hoist, 25 to 35 hp., double drum, three-phase, 60-cycle, 220-volt.

The Standard Oil Co., St. Paul and Franklin Streets, Baltimore, has plans for a two-story service and operating building, 90 x 100 ft., at Stockton and Seventh Streets, Richmond, Va., estimated to cost \$100,000. The first floor will be arranged for a general service and repair works.

The chief of air service, United States Army, Washington, will take bids until June 11 for 1000 straight side assembly airplane wheels, 36 x 8 in., circular CAS 133; until June 10 for one helium tank car, circular 127.

The Seaboard Air Line Railway Co., Portsmouth, Va., plans extensions and improvements in its locomotive repair shops at Abbeville, S. C., including the installation of additional equipment. A new engine house will replace a roundhouse recently damaged. A. B. Hall, Atlanta, Ga., engineer, will supervise construction.

The Common Council, Laurinburg, N. C., plans the installation of pumping equipment in connection with extensions and improvements in the waterworks for which a bond issue of \$175,000 is being sold. C. M. Fetter is clerk.

Fire, May 24, destroyed a portion of the fertilizer-manufacturing plant of the Central Chemical Co., Hagerstown, Md., with loss estimated at \$175,000 including equipment. Tentative plans are under consideration for rebuilding.

A. C. Miller & Co., 33 Gilmer Street, Atlanta, Ga., manufacturer of automobile truck bodies, etc., will begin the erection of a three-story and basement plant, 75 x 175 ft., estimated to cost \$110,000 including equipment. General contract has been let to A. K. Adams & Co., Luckie Street, Lockwood, Greene & Co., Atlanta, Ga., is architect and engineer.

The Ford Motor Co., Detroit, has awarded a general contract to the Ingalls Iron Works, Birmingham, for its proposed assembling plant at Norfolk, Va., including shipping docks and distributing and storage buildings, to cost approximately \$1,000,000 with equipment. A power house will be built.

Manual training equipment will be installed in the new high school to be erected at Rutherfordton, N. C., estimated to cost \$200,000, for which bids will soon be asked on a general contract. White, Street & Chamberlain, Gastonia, N. C., are architects.

The McKaig Machine & Exchange, Cumberland, Md., is in the market for a steel building, about 100 x 100 ft.

Pacific Coast

SAN FRANCISCO, June 3.

J. J. FORD, Claremont, Cal., is organizing a company to erect a rock-crushing plant at Upland, Cal. The entire works with machinery will cost about \$250,000.

The Western Electric Co., San Francisco, has leased a one-story factory to be built at Park Avenue and Hubbard Street, Emeryville, Cal. It will cost about \$40,000, and will be equipped by the company for the manufacture and repair of equipment. R. Vine Woods, 505 Seventeenth Street, Oakland, Cal., is engineer.

The Pacific Malleable Castings Co., Emeryville, Cal., has begun the construction of its new plant at Emeryville, estimated to cost \$70,000 with equipment.

The American Car & Foundry Co., 165 Broadway, New York, is said to be perfecting plans for expansion of its works at Seattle and Portland, heretofore the property of the Pacific Car & Foundry Co. Additions will be built and equipment installed for the production of railroad and logging cars and other railroad apparatus.

Fire, May 18, destroyed the central power house and portion of main mill of the Campbell Lumber Co., Seattle, Wash., on Lake Sammamish, with loss estimated at \$400,000 including equipment. It is planned to rebuild.

The Tropical Hardware Co., Huntington Park, Cal., has plans for a one-story factory on Regent Street to cost \$23,000 with equipment.

The Common Council, Vader, Wash., is considering the construction of a pumping plant on the Olequa River for the municipal waterworks.

The Consolidated Railway Equipment Co., Portland, Ore., has acquired the local plant of the North Pacific Spike Co., and will continue the manufacture of bridge and boat spikes, etc., in connection with its regular line of steel products.

The Knapp Metal Barrel Co., Balboa Building, San Francisco, recently organized, has plans for the erection of a new factory in the Parr Terminal section, Oakland, Cal., to manufacture special metal locking-head barrels, and other patented containers. It will cost close to \$50,000 including equipment. The new company is headed by James N. Gillett, former State Governor; W. S. Pardy and Louis M. Hoefler.

The Great Western Power Co., 14 Sansom Street, San Francisco, is perfecting plans for a combination automatic

power substation and steam-operated power plant at Twentieth Street and Telegraph Avenue, Oakland, Cal., to cost \$400,000 with machinery.

The Wiley Machine Co., Los Angeles, has started work on the erection of the initial unit of a new plant, 80 x 100 ft., which will be completed in July. Provision has been made for the erection of second unit of the same size. With the completion of its new plant the company will be well equipped to handle production work in metal stampings and screw machine products as well as its usual line of quality tools and dies. Hamm & Grant, Inc., Ferguson Building, Los Angeles, is the architect and engineer.

The Strain Sheet Metal Works, 1625 Sunset Boulevard, Los Angeles, recently formed, has purchased a factory site and is receiving bids on the construction of a building, 40 x 100 ft. No awards have yet been made. E. Goldzorg heads the company.

New England

BOSTON, June 2.

NO improvement in the machine tool business is reported in this territory. Local houses state business is even duller than in 1921, one of the slackest years in the history of the industry. Sales of one of the usually most active dealers last month did not exceed \$5,000 and the majority did even less. The purchase by a Rhode Island manufacturer, subject to approval, of six used 10-in. Pratt & Whitney milling machines was the only business of importance the past week.

Bids close today for a small amount of metal-working equipment required by Boston for its Winship school, Brighton district. New prospects have dropped to practically nothing. The most encouraging features in the machine tool situation are the stability of prices and the comparatively small stock of machines carried by both builders and dealers. Middle West machinery dealers are actively soliciting business in New England. Sales of small tools and parts hold up fairly well.

Contract has been awarded by the Green Shoe Mfg. Co., 75 Northampton Street, Boston, for a five-story, 42 x 170 ft. plant. A small machine shop is under consideration. Wesley & Minor, 60 Pemberton Street, Boston, are the architects.

Conveying equipment will be required for a 33 x 110 ft. shipping department unit contemplated by the Lever Brothers Co., 164 Broadway, Cambridge, Mass., soaps, bids on which will be shortly called. Plans are private.

A contract has been awarded by the Bridgeport Safety Emery Wheel Co., Bridgeport, Conn., for a one-story, 90 x 240 ft. plant in Stratford, Conn.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until June 10 for 3 lathes and spare parts for the Portsmouth Navy Yard, schedule 2250; also for three sets motor-driven mechanisms and three sets spare parts, schedule 2247; and for a quantity of steel and phosphor bronze springs, schedule 2270.

The Newickawanick Co., South Berwick, Me., is having plans drawn for a one-story power plant at its woolen mill to cost \$60,000. Charles T. Main, 200 Devonshire Street, Boston, is architect and engineer.

The Electro-Thermal Machinery Co., Inc., 82 Church Street, New Haven, Conn., recently organized to manufacture special electric apparatus for the heat-treatment of steel, etc., has plans for a one-story building, 90 x 182 ft. A 10-ton electric travelling crane will be installed. Dwight E. Smith, New Haven, is architect. Joseph E. Perry is president, and Daniel J. O'Keefe, secretary and treasurer.

Arthur Rosenstein, 7 State Street, Boston, architect, has plans under way for a one-story machine and general repair shop, 23 x 72 ft., in the Hyde Park section, estimated to cost \$20,000 with equipment.

The National Can Co., 36 North Washington Street, Boston, has work in progress at its new one-story plant, 120 x 160 ft., at Dorchester, to cost \$90,000 with equipment. Benjamin Steinberg, 200 Columbia Street, Cambridge, Mass., is general contractor.

Fire, May 29, destroyed a portion of the rock-crushing plant of William G. Barry, West Roxbury, Boston, with loss estimated at \$32,000 including equipment; the boiler plant and storage bins were also severely damaged. It is planned to rebuild.

The H. F. Livermore Co., 100 Cummington Street, Boston, mill supplies and equipment, has plans for a two-story machine shop, 75 x 245 ft., in the Allston section, estimated to cost \$115,000 including equipment. It will be built by the Union Realty Co., an affiliated organization.

Canada

TORONTO, June 2.

MACHINE tool sales for the month of May show some improvement over preceding months this year and prospects for continued activity are good. Inquiries are already making their appearance as a result of exhibits of Canadian manufacturers at the British Empire Exhibition and it is expected that the showing of equipment there will result in an increasing demand for machinery, tools, etc., for export.

It is reported that the Canadian Pacific Railway Co. plans to spend \$500,000 during the year on car shop machinery and equipment for a telegraph system. The Canadian National Railways have made several large purchases, but continue to issue small lists from time to time. The mining companies of northern Ontario are showing renewed interest in the equipment market and some good orders are in prospect. Automotive plants are furnishing a good part of the present demand for tools.

The Caloric Furnace Mfg. Co., 691 Bathurst Street, London, Ont., is in the market for foundry and special machinery for the manufacture of furnaces, etc. S. J. Shibley is manager.

The Sylvester Mfg. Co., Lindsay, Ont., manufacturer of railroad, gasoline and oil pumping engines, etc., is in the market for a Bliss press blanking machine. R. M. Sylvester is purchasing agent.

The Great Lakes Paper Co., Fort William, Ont., will start work immediately on the erection of a paper mill.

The E. B. Eddy Co., Ltd., Hull, Que., proposes to spend between \$1,000,000 and \$3,000,000 on improvements and additions to its plant.

The foundry of the McLean & Holt Co., Ltd., St. John, N. B., owned by J. L. McAvity, was destroyed by fire with a loss of \$100,000. Machinery and patterns are a total loss. The company manufactures cooking ranges and railroad equipment and will rebuild immediately. New equipment will be required.

Western Canada

The Board of Harbor Commissioners, Vancouver, B. C., is making arrangements for additions to No. 1 Government elevator to cost \$400,000; also addition to No. 3 elevator to cost \$250,000.

The ratepayers of Radville, Sask., carried a by-law authorizing the construction of an electric light plant to cost \$27,000. Plans are being prepared by A. A. Murphy, Saskatoon, Sask.

The Manitoba Pulp & Paper Co., Ltd., Winnipeg, has secured a site on Dawson Road, St. Boniface, Man., and will erect a plant at a cost of \$5,000,000.

STEEL AND INDUSTRIAL STOCKS

The range of prices on active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

Low	High	Low	High
Allis-Chalmers .. 43	43	Int. Har. 84 1/4	85 1/4
Am. B. S. & Fdy. 110	110	Int. Har. pf. 108 1/2	108 1/2
Am. Can. 102	105	Lima Loco. 56 3/4	58
Am. Can. pf. 114	114	Nat. Acme 7 1/4	7 7/8
Am. Car & Fdy. 160	160 1/4	Nat. En. & Stm. 22	24 1/4
Am. Locomotive. 71	73	N. Y. Air Brake. 39 3/4	40 1/2
Am. Loco. pf. 119	119 1/2	Otis Steel 7 1/4	7 1/2
Am. Radiator .. 97	99 3/4	Otis Steel pf. 53	53
Am. Steel Fdries. 34	34 3/4	Pressed Steel Car 47	48 7/8
Am. Stl. Fd. pf. 102 1/2	102 1/2	Railway Stl. Spg. 111 1/2	111 1/4
Bald. Loco. 107 1/4	110	Replogle Steel .. 8	8
Bald. Loco. pf. 115 1/2	115 1/4	Republic 43 1/2	45
Beth. Steel 47 1/4	49 3/4	Sloss-Sheffield .. 54 1/4	55
Beth. Stl. 7% pf. 92 3/4	93	Steel of Canada. 73	73 3/4
Beth. Stl. 8% pf. 106 3/4	106 3/4	Un. Alloy Steel.. 25	25 1/4
Br. Em. Stl. 2 pf. 10 1/4	10 1/2	U. S. Pipe 86	90 3/4
Chic. Pneu. Tool 84 1/2	86	U. S. Pipe pf. 92 3/4	92 3/4
Colo. Fuel 38 3/4	40 3/4	U. S. Steel 94 3/4	98 1/4
Crucible Steel .. 49 3/4	52 1/2	U. S. Steel pf. 119	119 3/4
Crucible Stl. pf. 89 3/4	90 1/4	Vanadium Steel. 21 1/2	22 3/4
Deere pf. 61	61	Va. I. C. & Coke 37	38
Gen. Electric ... 216	222	W'house E. & M. 56 1/4	57
Gt. No. Ore Cert. 26 1/4	26 3/4	Y'gstown S. & T. 63	63
Gulf States Steel 63 3/4	67		

Industrial Finance Notes

The Milwaukee Screw Machine Products Co., 1009 Cold Spring Avenue, Milwaukee, was made defendant on May 27 in involuntary proceedings by three creditors with claims aggregating about \$4,800. The Milwaukee Service Parts Co. has a claim of \$4,089.

The Wisconsin Truck Co., Madison, Wis., manufacturer of six-wheeled motor trucks and motorbus chassis, has filed a voluntary petition in bankruptcy, giving its assets at \$13,000 and liabilities at \$26,926. The first meeting of creditors has been called for June 5.

Lynn D. Joseph, Green Bay, Wis., has been elected trustee of the bankrupt estate of the J. F. Davis & Sons Co., De Pere, Wis., manufacturer of steel motor truck wheels and conducting a general structural and fabricating shop.

A stock dividend of 50 per cent recently was declared by the American Rolling Mill Co. on common stock, payable in ten annual installments of five per cent. Directors also declared a cash dividend of 50c. on common stock, payable July 15 to stock of record June 30. Stockholders approved the increase in authorized common stock from 20 to 30 millions, making possible the 50 per cent distribution.

First-quarter earnings of the Worthington Pump & Machinery Co. were consistently ahead of the corresponding period a year ago and it is understood that quarterly dividend requirements on major stocks running to about \$252,000, were covered in the first quarter this year. Orders since Jan. 1 have been about 30 per cent under those last year, but the volume of business in the first period of 1923

was unusually heavy. April's business was the largest for any single month in the previous half-year.

Stockholders of the International Harvester Co. have ratified proposals authorizing the sale to employees of \$15,000,000 preferred stock to be issued at the discretion of the board at not less than par. This is a step in plans being formulated to provide for profit-sharing by the employees.

Consolidated income account of the Iron Products Corporation for the first quarter shows net earnings of \$272,463, after expenses, charges and taxes. Surplus for the period was \$41,448. Previous surplus as of Jan. 1, 1924, stood at \$2,062,796.

Trade Changes

James H. Cumiskey, formerly factory manager for the Central Metal Products Corporation, College Point, L. I., manufacturer of hollow steel interior trim, has entered the field of general contracting and opened offices at Elmhurst, L. I.

The Economy Fuse & Mfg. Co., has moved its Chicago district sales office from 536 Transportation Building to larger quarters at 513 West Jackson Boulevard.

The Pittsburgh Testing Laboratory, Pittsburgh, now occupies its new laboratories and office building located on Stevenson Street at Locust.

Hickman, Williams & Co., Inc., dealer in pig iron and scrap, has moved its Chicago office from 1701 to 1214 McCormick Building.

Chicago headquarters of the Austin Co., engineer and builder, Cleveland, have been moved from the Continental and Commercial Bank Building to the Burnham Building, suite 1300, where its facilities have been enlarged considerably.

Industrial News Items

The Citizens Traction Co., Oil City, Pa., will double the capacity of its West End power plant in that city. The company has placed the order for a 500 hp. boiler with the Oil City Boiler Works and will install a 7500 kw. turbine, order for which has been placed. Day & Zimmerman, Inc., 1600 Walnut Street, Philadelphia, are managing engineers of this company.

Samuel T. Freeman & Co., auction house established in 1805, which for 16 years have been located at 1519-21 Chestnut Street, Philadelphia, have completed a new building at 1808-10 Chestnut Street, which they will occupy July 1. The new structure is 50 x 230 ft. and six stories high. It will afford better opportunities for the activities of the industrial plant sales division, which devotes itself to the liquidation of industrial plants.

The Reeves Pulley Co., Columbus, Ind., has disposed of its interest in the Reeves centerless grinder to Cincinnati interests. Plans for manufacturing the grinder are indefinite as yet.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates	
Bars:	Per Lb.
Refined iron bars, base price.....	3.49c.
Swedish charcoal iron bars, base.....	7.00c.
Soft steel bars, base price.....	3.49c.
Hoops, base price.....	4.59c.
Bands, base price.....	4.09c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base.....	3.59c.
Channels, angles and tees under 3 in. x ¼ in., base.....	3.49c.
Steel plates, ¼ in. and heavier.....	3.59c.

Merchant Steel	
	Per Lb.
Tire, 1½ x ½ in. and larger.....	3.55c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)....	4.05c.
Toe-calk, ½ x ¾ in. and larger.....	4.50c.
Cold-rolled strip, soft and quarter hard..	7.50c. to 8.50c.
Open-hearth, spring steel.....	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds.....	4.40c.
Squares, flats and hex.....	4.90c.
Standard tool steel, base price.....	15.00c.
Extra tool steel.....	18.00c.
Special tool steel.....	23.00c.
High-speed steel, 18 per cent tungsten.....	70c.

Sheets	
Blue Annealed	
	Per Lb.
No. 10.....	4.14c.
No. 12.....	4.19c.
No. 14.....	4.24c.
No. 16.....	4.34c.

Box Annealed—Black	
Soft Steel	Blued Stove
C. R., One Pass	Pipe Sheet
Per Lb.	Per Lb.
Nos. 18 to 20.....	4.55c. to 4.70c.
Nos. 22 and 24.....	4.70c. to 4.85c.
No. 26.....	4.75c. to 4.90c.
No. 28*.....	4.85c. to 5.00c.
No. 30.....	5.05c. to 5.20c.

Galvanized	
	Per Lb.
No. 14.....	4.95c. to 5.10c.
No. 16.....	5.10c. to 5.25c.
Nos. 18 and 20.....	5.25c. to 5.40c.
Nos. 22 and 24.....	5.40c. to 5.55c.
No. 26.....	5.55c. to 5.70c.
No. 28*.....	5.85c. to 6.00c.
No. 30.....	6.35c. to 6.50c.

*No. 28 and lighter, 36 in. wide, 20c. higher.

Standard Steel	
Black	Galv.
½ in. Butt... —41	—24
¾ in. Butt... —46	—32
1-3 in. Butt... —48	—34
2½-6 in. Lap... —44	—30
7-8 in. Lap... —41	—11
9-12 in. Lap... —34	—6

Welded Pipe	
Black	Galv.
½ in. Butt... —4	+19
¾ in. Butt... —11	+9
1-1½ in. Butt... —14	+6
2 in. Lap... —5	+14
2½-6 in. Lap... —9	+9
7-12 in. Lap... —3	+16

Bolts and Screws	
Machine bolts, cut thread,	
45 and 10 to 45, 10 and 10 per cent off list	
Carriage bolts, cut thread,	
35 and 10 to 35, 10 and 10 per cent off list	
Coach screws, 45 and 10 to 45, 10 and 10 per cent off list	
Wood screws, flat head iron,	
75, 20 and 10 per cent off list	

Steel Wire	
BASE PRICE* ON NO. 9 GAGE AND COARSER	
	Per Lb.
Bright basic.....	4.25c. to 4.50c.
Annealed soft.....	4.50c. to 4.75c.
Galvanized annealed.....	5.15c. to 5.40c.
Coppered basic.....	5.15c. to 5.40c.
Tinned soft Bessemer.....	6.15c. to 6.40c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire	
BASE PRICE	
High brass sheet.....	16¼c. to 17¼c.
High brass wire.....	17¼c. to 18¼c.
Brass rods.....	14½c. to 15½c.
Brass tube, brazed.....	24¼c. to 25¼c.
Brass tube, seamless.....	21 c. to 22 c.
Copper tube, seamless.....	22¼c. to 23¼c.

Copper Sheets	
Sheet copper, hot rolled, 20¼c. to 20¾c. per lb. base.	
Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.	

Tin Plates	
Bright Tin	Coke—14 x 20
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20
IC.. \$11.75	\$9.50
IX.. 13.25	11.50
IXX.. 14.50	12.50
IXXX.. 15.50	13.75
IXXXX.. 16.50	14.75

Terne Plates	
8 lb. coating. 14 x 20	
100 lb.	\$7.00 to \$8.00
IC.....	7.25 to 8.25
IX.....	8.25 to 8.75
Fire door stock.....	9.00 to 10.00

Tin	
Straits pig.....	46c.
Bar.....	48c. to 53c.

Copper	
Lake ingot.....	16 c.
Electrolytic.....	15½c.
Casting.....	14½c.

Spelter and Sheet Zinc	
Western spelter.....	7½c.
Sheet zinc, No. 9 base, casks.....	10¼c. open 11¼c.

Lead and Solder*	
American pig lead.....	8½c. to 9c.
Bar lead.....	11c. to 12c.
Solder, ½ and ½ guaranteed.....	33½c.
No. 1 solder.....	31½c.
Refined solder.....	27½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal	
Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.....	35c. to 50c.
Grade D, per lb.....	25c. to 35c.

Antimony	
Asiatic.....	11c. to 11½c.

Aluminum	
No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.....	36c.

Demand is quiet and values are unsettled. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible.....	10.75
Copper, heavy wire.....	10.50
Copper, light bottoms.....	8.75
Brass, heavy.....	6.25
Brass, light.....	5.00
Heavy machine composition.....	8.00
No. 1 yellow brass turnings.....	6.50
No. 1 red brass or composition turnings.....	7.75
Lead, heavy.....	5.75
Lead, tea.....	4.25
Zinc.....	3.50
Cast aluminum.....	14.50
Sheet aluminum.....	14.50

JUN 13 1924

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THE IRON AGE

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Entered as second-class matter June 18, 1879, at Post Office
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Milestones in Walworth Progress

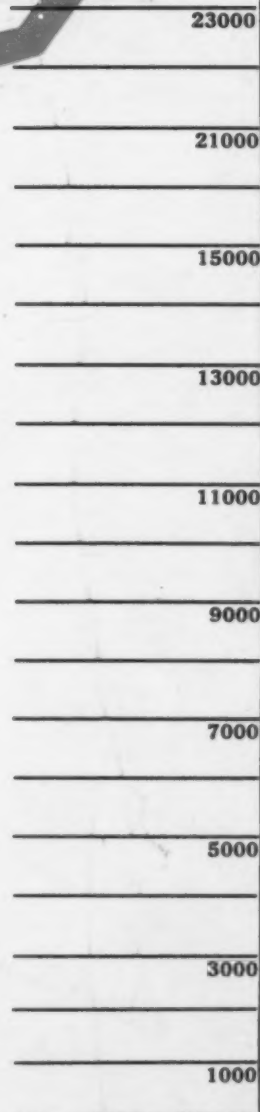
- 1842—Walworth Manufacturing Company founded by J. J. Walworth.
- 1844—"Walworth & Nason" became the first concern in America engaged in business of steam warming of buildings.
- 1869—Stillson Wrench invented by Daniel Stillson, an employee of Walworth Manufacturing Company.
- 1872—Boston Fire, seriously crippling Walworth.
- 1875—First telephone conversation in the world—over Walworth's private telegraphic wire.
- 1881—Plant moved to present location, South Boston.
- 1892—First complete Walworth Catalog issued, costing about \$7,000.
- 1900—First Kewanee Union put on market by present Walworth Kewanee plant. Capacity today over 1,000,000 a year.
- 1912—Howard Coonley made President. Epoch of expansion begins.
- 1914—Chicago Branch added.
- 1916—New York Branch added.
- 1917—Kewanee Plant purchased from National Tube Company. Capacity of Walworth Company tripled.
- 1918—Seattle Branch added.
- 1919—Philadelphia Branch added.
- 1920—Walworth International Company founded to take care of rapidly expanding foreign business.
- 1921—Portland, Oregon, Branch added.
- 1922—Cleveland and Youngstown Branches added.
- 1923—London and Glasgow Branches added.

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WALWORTH INTERNATIONAL COMPANY, NEW YORK
FOREIGN REPRESENTATIVE



The rising line is not intended to show the exact number of Walworth articles made year by year, but to indicate a rising trend in the Walworth complete line.

23,000 Valves Fittings & Tools for steam, water gas, oil and air



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